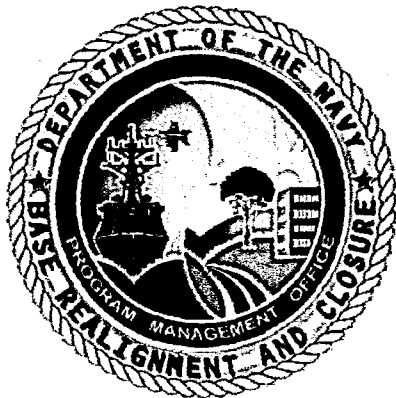


EXHIBIT 8



Final

Record of Decision for Parcel UC-2

**Hunters Point Shipyard
San Francisco, California**

December 17, 2009

Prepared by:

**Department of the Navy
Base Realignment and Closure
Program Management Office West
San Diego, California**

Prepared under:

**Naval Facilities Engineering Command
Contract Number N62473-07-D-3213
Contract Task Order 039**

This public summary represents information presented in the document listed below.

Public Summary: Final Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California, December 17, 2009

The Department of Navy has prepared this final record of decision (ROD) to address remaining contamination at Parcel UC-2 at Hunters Point Shipyard in San Francisco, California. The remedial action selected in this ROD is necessary to protect the public health, welfare, and the environment from actual or potential releases of contaminants from this parcel. The selected remedial action for Parcel UC-2 addresses metals (especially arsenic and manganese) in soil, volatile organic compound (VOC) vapors from groundwater in the A-aquifer, and radionuclides in structures (storm drains and sanitary sewers) and the soil associated with these structures.

In 2009, the Navy divided the former Parcel C into two new parcels: UC-2 and C. One overall remedy was selected for Parcels UC-2 and C; however, many of the actions in the overall remedy are not required at Parcel UC-2 based on the types and locations of contaminants. Only remedy components relevant to Parcel UC-2 were evaluated in this ROD. The Navy considered the following remedial alternatives for contaminants in soil: (S-1) no action; (S-2/3) institutional controls (IC), and maintained landscaping; and (S-4/5) covers and ICs. The Navy considered the following remedial alternatives for contaminants in groundwater: (GW-1) no action; (GW-2) long-term monitoring and ICs; and (GW-3/4) monitored natural attenuation (MNA) and ICs. The Navy considered the following remedial alternatives for radiologically impacted structures (storm drains and sanitary sewers) and the soil associated with these structures: (R-1) no action; and (R-2) surveying radiologically impacted areas, excavating storm drain and sanitary sewer lines and soils in impacted areas, and screening, separating, and disposing of radioactive sources and contaminated excavated soil at an off-site, low-level radioactive waste facility. The selected remedy for Parcel UC-2 is Alternative S-4/5 for soil; Alternative GW-3/4 for groundwater; and Alternative R-2 for radiologically impacted structures (storm drains and sanitary sewers) and the soil associated with these structures. Implementation of the remedy at Parcel UC-2 will consist of durable covers and ICs to address soil contamination; MNA and ICs to address groundwater contamination; and removal of storm drains and sanitary sewer lines and excavation of soil to address radiologically impacted soil and structures.

Information Repositories: A complete copy of the “Final Record of Decision for Parcel UC-2” dated December 17, 2009, is available to community members at:

San Francisco Main Library
100 Larkin Street
Government Information Center, 5th Floor
San Francisco, CA 94102
Phone: (415) 557-4500

Anna E. Waden Bayview Library
5075 Third Street
San Francisco, CA 94124
Phone: (415) 355-5757

The report is also available to community members on request to the Navy. For more information about environmental investigation and cleanup at Hunters Point Shipyard, contact Sarah Koppel, remedial project manager for the Navy, at:

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- 1 Applicable or Relevant and Appropriate Requirements
- 2 Responsiveness Summary
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ACRONYMS AND ABBREVIATIONS

§	Section
µg/L	Microgram per liter
ARAR	Applicable or relevant and appropriate requirement
ARIC	Area requiring institutional controls
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulations</i>
COC	Chemical of concern
CSM	Conceptual site model
cy	Cubic yard
dpm/100cm ²	Disintegrations per minute per 100 square centimeters
DTSC	Department of Toxic Substances Control
ELCR	Excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility study
GRA	General response action
HHRA	Human health risk assessment
HI	Hazard index
HPAL	Hunters Point ambient level
HPS	Hunters Point Shipyard
HRA	Historical Radiological Assessment
IC	Institutional control
IR	Installation Restoration
LUC RD	Land use control remedial design
mg/kg	Milligram per kilogram
millirem	One thousandth of a rem (10 ⁻³)
MNA	Monitored natural attenuation
MOA	Memorandum of agreement
mrem/yr	Millirem per year
msl	Mean sea level

ACRONYMS AND ABBREVIATIONS (Continued)

NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NRDL	Naval Radiological Defense Laboratory
O&M	Operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary assessment
pCi/g	Picocurie per gram
pCi/L	Picocurie per liter
PQL	Practical quantitation limit
RAO	Remedial action objective
RBC	Risk-based concentration
RD	Remedial design
RI	Remedial investigation
RME	Reasonable maximum exposure
RMP	Risk management plan
RMR	Risk management review
ROD	Record of Decision
RU	Remedial unit
SARA	Superfund Amendments and Reauthorization Act
SI	Site inspection
SVE	Soil vapor extraction
TCRA	Time-critical removal action
VOC	Volatile organic compound
Water Board	San Francisco Bay Regional Water Quality Control Board
ZVI	Zero-valent iron

1.0 DECLARATION

This Record of Decision (ROD) presents the selected remedy for Parcel UC-2 at Hunters Point Shipyard (HPS) in San Francisco, California. HPS was included on the National Priorities List (NPL) in 1989 (U.S. Environmental Protection Agency [EPA] ID: CA1170090087). The remedy was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Title 42 *United States Code* Section [§] 9601, et seq.) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 *Code of Federal Regulations* [CFR] Part 300). This decision is based on information contained in the administrative record¹ ([Attachment 4](#)) for the site. Information not specifically summarized in this ROD or its references but that is contained in the administrative record has been considered and is relevant to the selection of the remedy at Parcel UC-2. Thus, the ROD is based on and relies on the entire administrative record file in making the decision.

The Department of the Navy and EPA jointly selected the remedy for Parcel UC-2, and the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) and the San Francisco Bay Regional Water Quality Control Board (Water Board) concur on the remedy for Parcel UC-2. The Navy provides funding for site cleanups at HPS. The Federal Facility Agreement (FFA) for HPS documents how the Navy intends to meet and implement CERCLA in partnership with EPA, DTSC, and the Water Board.

Parcel UC-2 was part of the former Parcel C. The former Parcel C is one of six parcels (Parcels A through F) originally designated for environmental restoration. The boundaries of Parcels B and C were redefined in 1997 and 2002, and Installation Restoration (IR) 06 (2002) and IR-25 (1997) became part of the former Parcel C. In 2009, the Navy divided the former Parcel C into two new parcels: UC-2 and C. Parcel C is not part of this ROD. Long-term uses in specified areas within Parcel UC-2 include mixed use and research and development.

Environmental investigations began in 1984 at the former Parcel C, which includes Parcel UC-2. A Draft Final Remedial Investigation (RI) Report for the former Parcel C was completed in 1997; the Draft Final RI for Parcel B (which covers IR-06 and IR-25) was completed in 1996. The revised Final Feasibility Study (FS) Report for the former Parcel C was completed in 2008. This ROD documents the final remedial action selected for Parcel UC-2 and does not include or affect any other sites at HPS.

¹ **Blue text** identifies detailed site information available in the administrative record and listed in the references table ([Attachment 3](#)). This ROD is also available on CD, whereby **blue text** serves as a hyperlink to reference information. The hyperlink will open a text box at the top of the screen. A blue box surrounds applicable information in the hyperlink. To the extent there may be any inconsistencies between the referenced information attached to the ROD via hyperlinks and the information in the basic ROD itself, the language in the basic ROD controls.

1.1 SELECTED REMEDY

The CERCLA remedial action selected in this ROD is necessary to protect the public health, welfare, and the environment from actual or potential releases of contaminants from the site. The selected remedial action for Parcel UC-2 addresses metals in soil and radionuclides in soil and structures associated with storm drains and sewer lines. The remedial action also addresses volatile organic compounds (VOC) in groundwater. Parcel UC-2 was evaluated as part of the FS for the former Parcel C and Proposed Plan for Parcels C and UC-2. However, this ROD addresses only those releases located within the newly defined Parcel UC-2 and does not address the balance of the former Parcel C. Implementation of the remedy at Parcel UC-2 will consist of durable covers and institutional controls (IC) to address soil contamination; monitored natural attenuation (MNA) and ICs to address groundwater contamination; and removal of storm drains and sanitary sewer lines and excavation of soil to address radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures.

The selected remedial action is protective of human health and the environment, complies with federal and state statutes and regulations that are applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedial action uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The selected remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because there is no cost-effective means of treating the large quantity of low-level soil contamination and low-level groundwater contamination. A statutory review will be conducted within 5 years after the remedial action is initiated to ensure that the remedy is protective of human health and the environment.

1.2 DATA CERTIFICATION CHECKLIST

The following information is included in [Section 2.0](#) of this ROD. Additional information can be found in the administrative record file for this site:

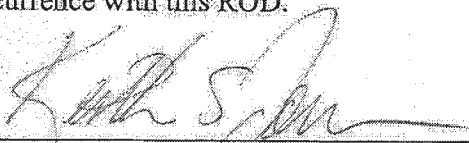
- Chemicals of concern (COC) and their concentrations ([Sections 2.3 and 2.5](#)).
- Baseline risk represented by the COC ([Section 2.5](#)).
- Remediation goals established for COCs and the basis for these goals ([Sections 2.5 and 2.7](#)).
- Principal threat wastes ([Section 2.6](#)).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater ([Section 2.4](#)).
- Potential land and groundwater use that will be available at the site as a result of the selected remedy ([Section 2.9.3](#)).

- Estimated capital costs, annual operation and maintenance (O&M), and total present-worth costs; discount rate; and the number of years over which the remedy cost estimate is projected ([Table 7](#)).
- Key factors that led to selecting the remedy (for example, a description of how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) ([Section 2.9.1](#)).

1.3

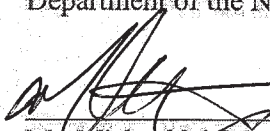
AUTHORIZING SIGNATURES

This signature sheet documents the Navy's and EPA's co-selection of the remedy in this ROD. This signature sheet also documents the State of California's (DTSC and Water Board) concurrence with this ROD.



Mr. Keith S. Forman
Base Realignment and Closure Environmental Coordinator
Base Realignment and Closure Program Management
Office West
Department of the Navy

12/17/09
Date



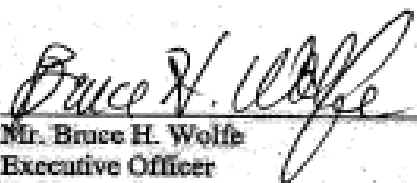
Mr. Michael M. Montgomery
Assistant Director of Federal Facilities
and Site Cleanup Branch, Region 9
U.S. Environmental Protection Agency

12/17/09
Date



Dr. Ryan K. Miya
San Francisco Peninsula Team Leader
California Environmental Protection Agency
Department of Toxic Substances Control

12/23/09
Date



Mr. Bruce H. Wolfe
Executive Officer
California Environmental Protection Agency
San Francisco Bay Regional Water Quality Control Board

12/22/09
Date

2.0 DECISION SUMMARY

2.1 SITE DESCRIPTION AND HISTORY

HPS is located in southeastern San Francisco on a peninsula that extends east into San Francisco Bay (see [Figure 1](#)). HPS consists of 866 acres: 420 acres on land and 446 acres under water in the San Francisco Bay. In 1940, the Navy obtained ownership of HPS for shipbuilding, repair, and maintenance. After World War II, activities at HPS shifted to submarine maintenance and repair. HPS was also the site of the Naval Radiological Defense Laboratory (NRDL). HPS was deactivated in 1974 and remained relatively unused until 1976. Between 1976 and 1986, the Navy leased most of HPS to Triple A Machine Shop, Inc., a private ship repair company. In 1987, the Navy resumed occupancy of HPS.

HPS property was included on the NPL in 1989 pursuant to CERCLA as amended by SARA because past shipyard operations left hazardous substances on site. In 1991, HPS was designated for closure pursuant to the Defense Base Closure and Realignment Act of 1990. Closure at HPS involves conducting environmental remediation and making the property available for nondefense use.

The former [Parcel C_{\(1\)}](#) historically included about 79 acres in the central portion of the shipyard (see [Figure 1](#)), was formerly part of the industrial support area, and was used for shipping, ship repair, and office and commercial activities. Industrial support facilities for ship repair dominated the land use at the former Parcel C and included a foundry, a power plant, a sheet manufacturing shop, a paint shop, and various machine shops; 70 buildings are located within the boundaries of the former Parcel C. The docks at the former Parcel C were formerly part of the industrial production area. Portions of the former Parcel C were also used by NRDL. In 2002, the boundaries of Parcel B and C were redefined, and IR-06 and IR-25 became part of the former Parcel C. In 2009, the Navy divided the former Parcel C into new parcels: [Parcel UC-2_{\(2\)}](#) and Parcel C. Parcel UC-2 was split from the former Parcel C because transfer of this property provides access to Fisher Avenue and the nearby utility corridor for redevelopment. Parcel UC-2 is about 3.9 acres (see [Figure 2](#)); the current Parcel C is not addressed in this ROD.

Historical use of the southern portion of Parcel UC-2 is as a roadway (Fisher Avenue) and the northern portion is as a triangularly shaped parking lot (at the corner of Fisher Avenue and Robinson Street) for Building 101. The roadway was constructed by placing borrowed fill, and the parking lot is located on the original promontory with native soil over shallow bedrock. These features apply to most of the parcel, with a limited amount of property directly adjacent to them; there are no buildings. Along the western side of Fisher Avenue is a sharp rise of 5 to 15 feet that is vegetated with ice plant and annual grass.

The storm drains and sanitary sewers in Parcel UC-2 are considered radiologically impacted because operations at HPS resulted in the disposal of radioactive materials through these systems. These wastes included materials from ship and personnel decontamination, fallout samples, and radioactive materials from refurbishment of radioluminescent devices, including radium-bearing paint.

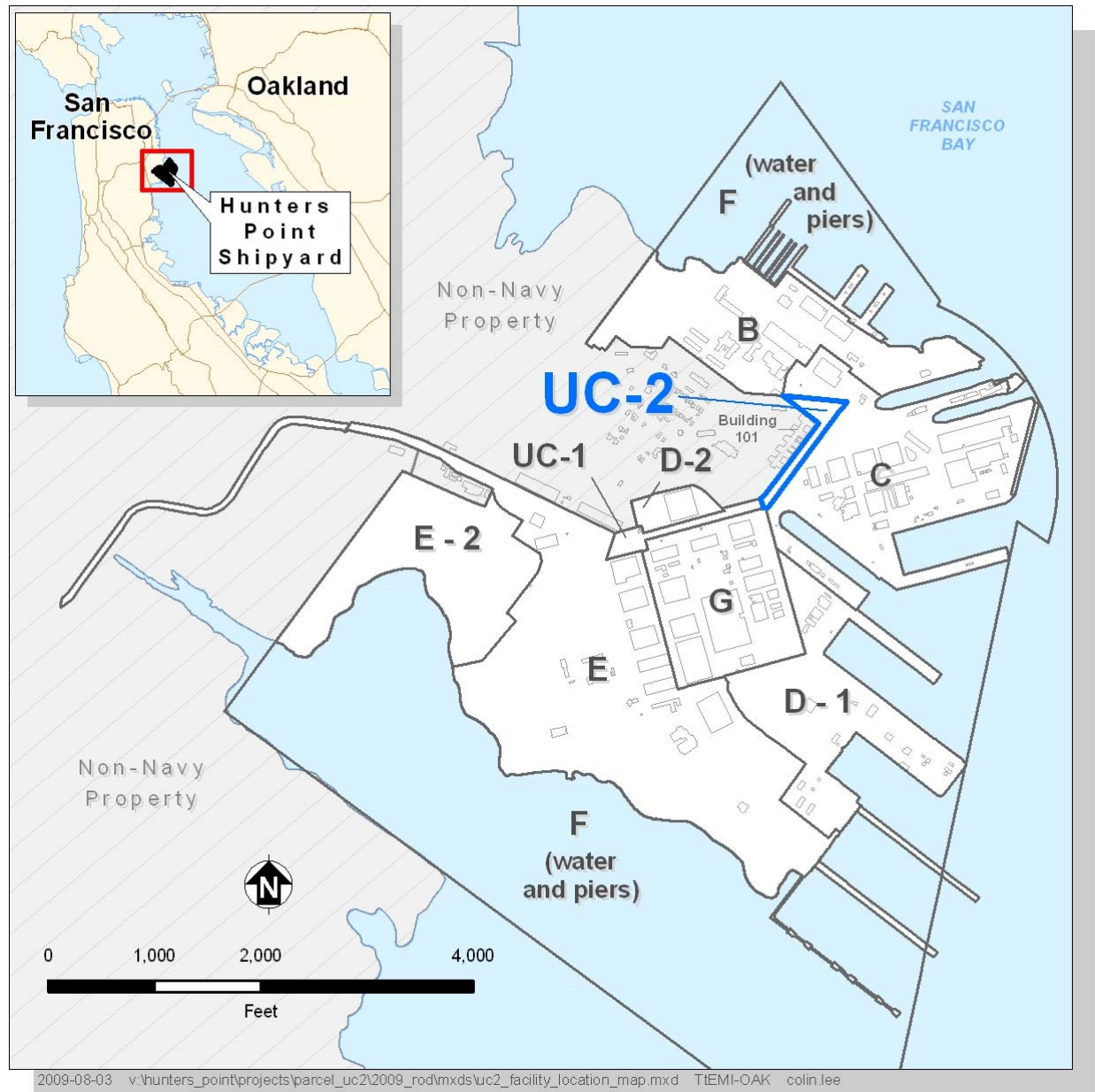


Figure 1. Facility Location Map with the Boundary of Parcel UC-2

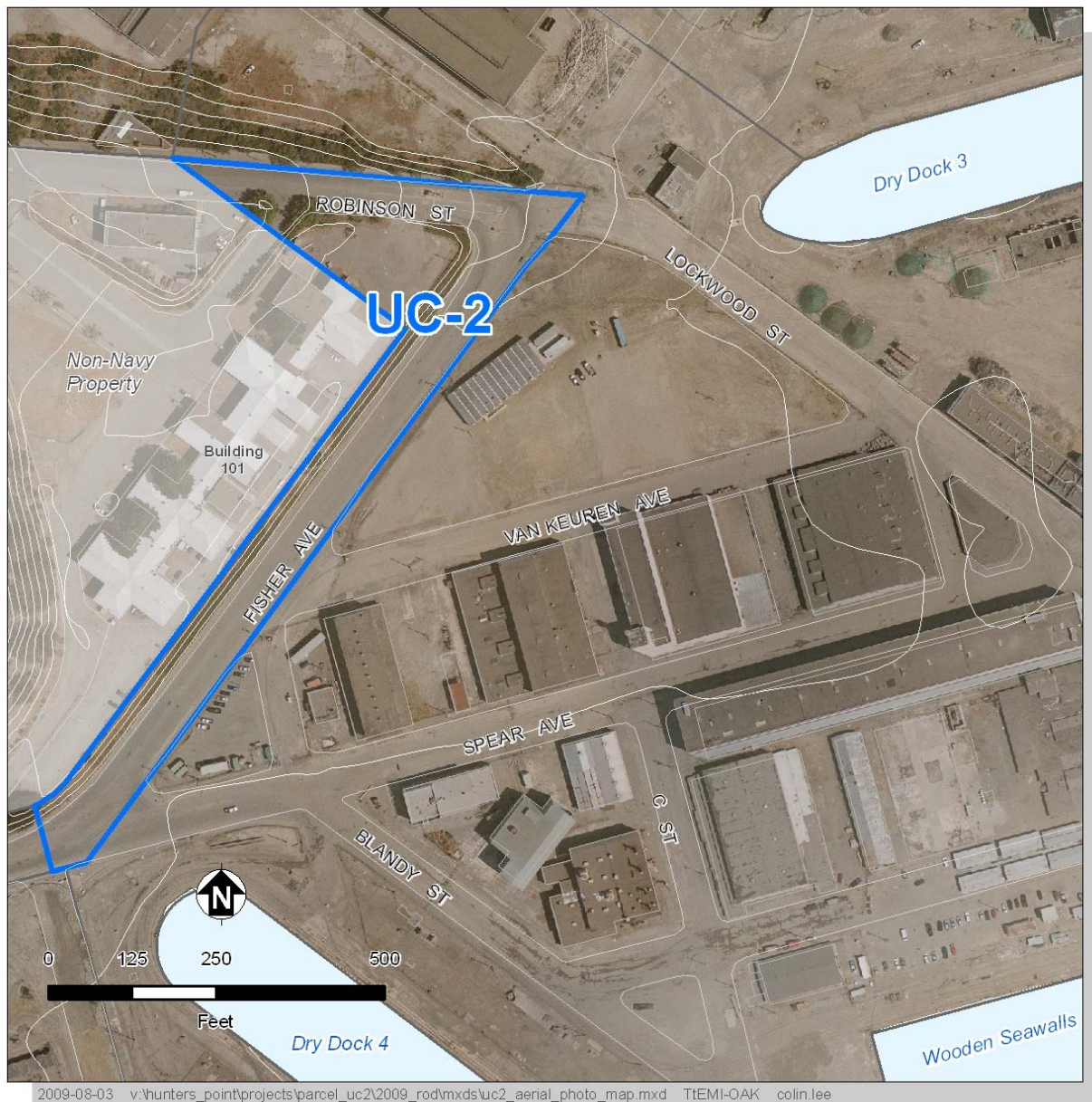


Figure 2. Parcel UC-2 Location Map

The original redevelopment plan developed by the San Francisco Redevelopment Agency in 1997 divided Parcel UC-2 into reuse areas. The reuse areas include mixed use and research and development. The area was divided into redevelopment blocks to facilitate discussion of all areas of the parcel in the context of contamination and cleanup issues. As shown in Figure 3, the redevelopment blocks (and associated reuses) for Parcel UC-2 are 10 (mixed use) and 17 (research and development); unlabelled areas are planned future roads. Figure 4 shows IR-06, the only **IR site₍₃₎** that is within Parcel UC-2. The IR-06 plume that crosses into Parcel UC-2 primarily contains low-level carbon tetrachloride; carbon tetrachloride has not been consistently detected in any other area of IR-06 and does not have an identified source.

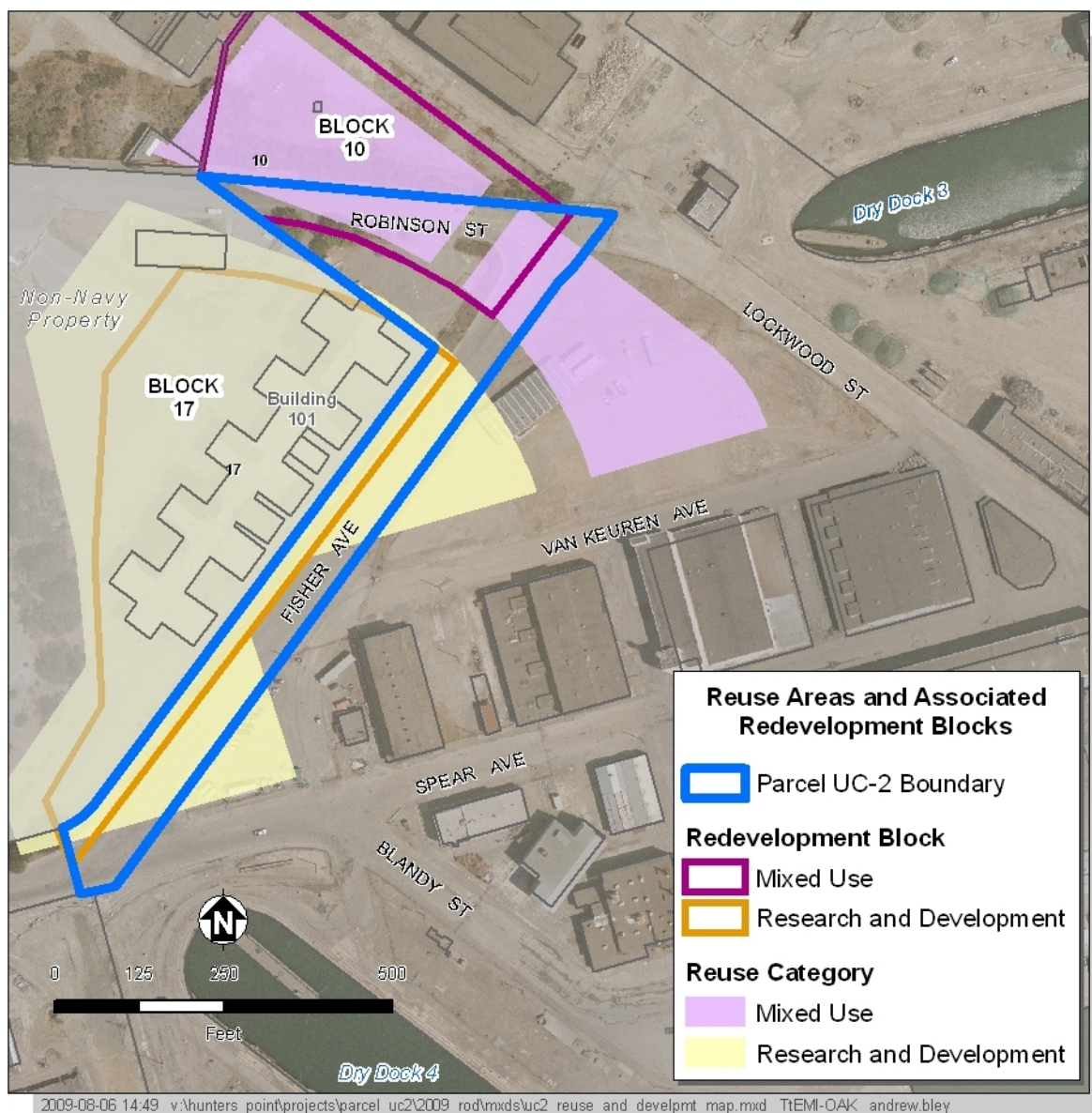


Figure 3. Reuse Areas and Associated Redevelopment Blocks

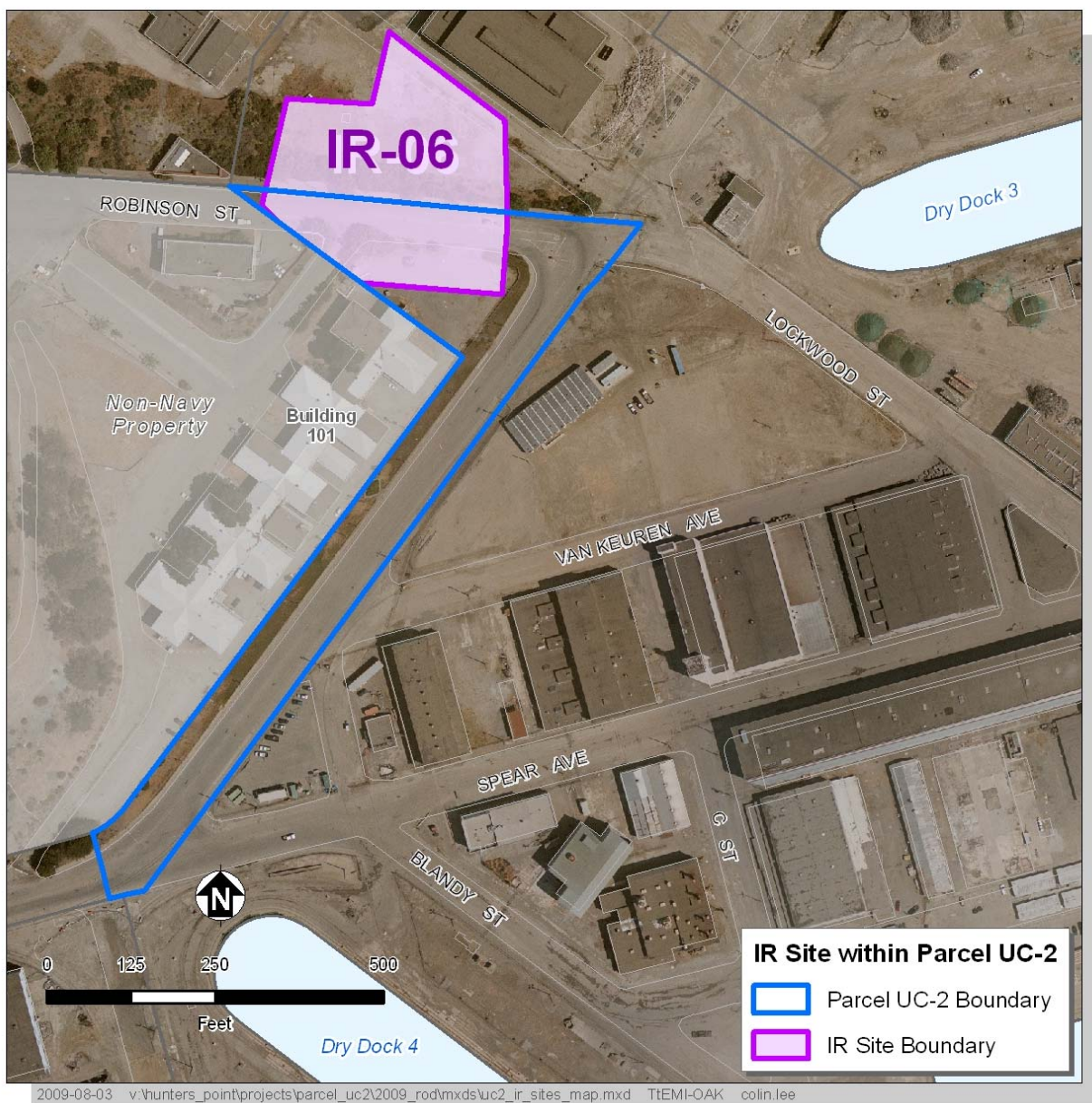


Figure 4. IR Site within Parcel UC-2

2.2 SITE CHARACTERISTICS

The northern and western portions of Parcel UC-2 consist of the original promontory, with native soil over shallow bedrock, while the eastern portion of Parcel UC-2 consists of flat lowlands. The lowlands were constructed by placing borrowed fill material from various sources, including crushed serpentinite bedrock from the adjacent highland. Most surface elevations in Parcel UC-2 are between 5 to 15 feet above mean sea level (msl), although surface elevations in the northern portion are 20 to 30 feet above msl. The serpentinite bedrock and serpentine bedrock-derived fill material consist of minerals that naturally contain asbestos and relatively high concentrations of arsenic, manganese, nickel, and other metals.

The **hydrostratigraphic units**⁽⁴⁾ present at Parcel UC-2 include the shallow A-aquifer and an upper bedrock water-bearing zone. The B-aquifer is not present at Parcel UC-2. The shallow A-aquifer at Parcel UC-2 exists primarily within the shallow bedrock. The A-aquifer at Parcel UC-2 is expected to occur between 17.5 feet above msl at the northern end of the parcel, down to 2 feet above msl at the southern end of the parcel. These groundwater elevations are largely inferred from wells surrounding Parcel UC-2 and the topography of the area. Groundwater in the A-aquifer is not suitable as a potential source of **drinking water**⁽⁵⁾.

The general pattern of groundwater flow is radially away from the former Parcel A topographic high (west of Parcel UC-2) and toward the shoreline. At Parcel UC-2, the general direction of groundwater flow is to the east, where groundwater discharges into the San Francisco Bay. Leaking storm drains, sewer lines, and water supply lines also influence groundwater movement across the former Parcel C. The principal sources of groundwater recharge for the A-aquifer at the former Parcel C are considered to be the horizontal flow from areas upgradient of Parcel UC-2, precipitation infiltration, and leaking sections of water lines. Discharge from the A-aquifer occurs principally as lateral flow of groundwater to the San Francisco Bay at the shore or through leaking utility corridors.

Parcel UC-2 ecology⁽⁶⁾ is limited to those plant and animal species adapted to the industrial environment. The majority of Parcel UC-2 is covered by pavement and with little open space for flora and fauna; therefore, Parcel UC-2 has little habitat value for terrestrial ecological receptors. No threatened or endangered species are known to inhabit Parcel UC-2 or its immediate vicinity.

Although Parcel UC-2 fuel and steam lines were removed or closed in 2002, the storm drains and sanitary sewer lines beneath the parcel remain key site characteristics (**Figure 5**). Survey and removal of the Parcel UC-2 storm drain and sanitary sewer lines were completed in early October 2009. The draft radiological survey unit report is planned for early spring in 2010.

2.3 PREVIOUS INVESTIGATIONS

Potential contamination at Parcel UC-2 is associated with metals in soil, VOCs in groundwater, and radiologically impacted structures (storm drains and sanitary sewers), and soil associated with these structures. Assessment of contamination and risk for Parcel UC-2 is based on the Final FS Report for Parcel C (July 31, 2008), including the revised human health risk assessment (HHRA), and the radiological addendum to the FS Report (June 20, 2008). The Final FS Report for Parcel C considered new information associated with an interim removal action and groundwater data gaps investigation conducted at the former Parcel C. Both the FS and HHRA are detailed in the Final FS Report for Parcel C. The FS Report and radiological addendum summarize the most recent information available on Parcel UC-2 and provide the basis for the ROD for Parcel UC-2. **Table 1** summarizes the previous studies, investigations, and removal actions conducted at the Parcel UC-2.

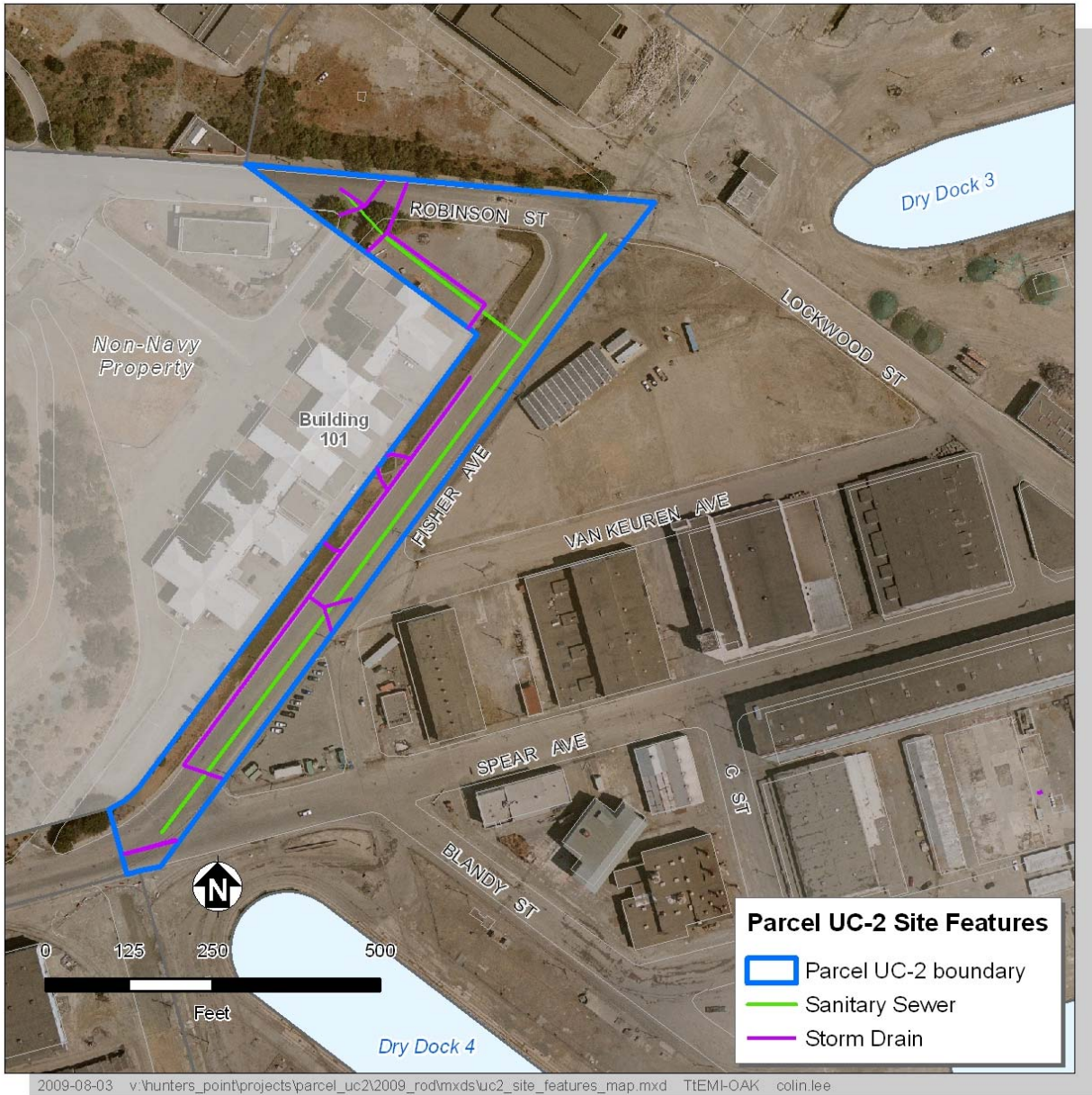


Figure 5. Parcel UC-2 Site Features

TABLE 1: PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Previous Investigation/ Removal Action ^a	Date	Investigation/Removal Action Activities
Investigations and Studies		
Preliminary Assessment (PA)	1984-1990	The 1990 PA for the former Parcel C, including Parcel UC-2, involved record searches, on-site surveys, interviews, and limited field investigations. The PA report concluded that portions of former Parcel C (including IR-06, which partially overlays Parcel UC-2) warranted further investigation because of the potential for contamination of soil and groundwater from past site activities.
Site Inspection (SI)	1994	The SI evaluated whether contamination was present and whether a release to the environment had occurred, evaluated each site for inclusion in the IR program, and eliminated sites that posed no significant threats to public health or the environment. Additional field data were collected, including geophysical surveys of suspected subsurface fuel lines; collection of soil and groundwater samples from borings; installation of monitoring wells and collection of groundwater samples; collection of shallow soil samples; trenching, mapping, inspection, and sample collection from the steam lines and sanitary sewers; video surveys of the sanitary sewers; and sump and floor scrape sampling. Soil and groundwater samples were collected in areas adjacent to the current Parcel UC-2 boundary, but no soil or groundwater samples were collected within the current UC-2 boundary at the SI stage. Based on the results of the SI, nine sites (including IR-06, which partially overlays Parcel UC-2) were recommended for inclusion in RI activities.
Remedial Investigation	1993-1997	Site conditions were further assessed: literature searches; interviews with former on-site employees; geophysical, radiological, and aerial map surveys; installation of soil borings and monitoring wells; aquifer testing; indoor air testing; and storm drain inspection. Soil and groundwater samples were collected in areas adjacent to the current Parcel UC-2 boundary, but no soil or groundwater samples were collected within the current UC-2 boundary at the RI stage. The following samples⁽⁷⁾ were collected at IR-06, which partially overlays Parcel UC-2: 232 soil and 224 groundwater samples. Samples were analyzed for one or a combination of the following chemicals: metals, VOCs, semivolatile organic compounds, pesticides, polychlorinated biphenyls, and petroleum-related products. Removal actions were conducted, including aboveground storage tanks, tank farm, sandblast grit, and storm drain sediment, as well as asbestos and lead abatement. Based on the RI results, the 12 sites (including IR-06, which partially overlays Parcel UC-2) were recommended for further evaluation in an FS.

TABLE 1: PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS (CONTINUED)

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Previous Investigation/ Removal Action ^a	Date	Investigation/Removal Action Activities
Investigations and Studies (Continued)		
Feasibility Study – Initial Phase	1996-1998	<p>Results and analyses in the RI Report were used to identify, screen, and evaluate remedial alternatives and to define areas for proposed remedial action. Three different cleanup scenarios and associated cleanup goals were considered: cleanup to the industrial land use scenario (10^{-5} excess lifetime cancer risk [ELCR]); cleanup to the industrial land use scenario (10^{-6} ELCR); and cleanup to the residential land use scenario (10^{-6} ELCR). Each scenario also considered cleanup of soils representing a hazard index (HI) greater than 1 and lead concentrations greater than 1,000 milligrams per kilogram (mg/kg).</p> <p>Areas exceeding different cleanup goals for each reuse scenario and cleanup level were delineated, risk drivers were identified, and the extent of the cleanup areas was defined. Five IR sites and parts of two additional IR sites had cleanup areas based on residential use (including IR-06, which partially overlays Parcel UC-2), one IR site and parts of two more IR sites had cleanup areas based on industrial use, and one IR site and parts of two more IR sites had areas based on recreational use. All soil cleanup areas exceeding at least one of the various cleanup criteria under each reuse scenario were identified.</p>
Risk Management Review (RMR) Process	1999	<p>The RMR process was developed and conducted during a series of meetings held by the Navy and the regulatory agencies from January through April 1999. The process used various criteria and decision rules to reevaluate whether remedial actions were required at all of the 14 IR sites in former Parcel C that were originally identified as requiring remedial actions for soil. Of the 14 IR sites (including IR-06 which partially overlays Parcel UC-2), six were recommended for action after the RMR process. After the review had been completed, all sites fell into one of the following three categories: (1) sites where the team agreed no response action was required, (2) sites where the team agreed response action was required, and (3) sites where the team did not yet agree on the course of action. Based on the RMR results₍₈₎, the sites and chemicals requiring further evaluation and remedial action were revised.</p>
Groundwater Data Gaps Investigation	2002-2008	<p>A data gaps investigation (including IR-06, which partially overlays Parcel UC-2) was completed to provide additional understanding of the groundwater conditions underlying the parcel. To better define the vertical and horizontal extent of plumes, 17 monitoring wells were installed and groundwater samples were collected from these wells and 120 additional monitoring wells. Groundwater levels in 73 monitoring wells were measured, aquifer testing was conducted, and tidal influence and mixing studies were completed to better understand the groundwater conceptual model. Specifically, Parcel UC-2 monitoring wells IR06MW54F, IR06MW55F, IR06MW57F, and IR06MW58F were monitored as part of this investigation.</p>

TABLE 1: PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS (CONTINUED)

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Previous Investigation/ Removal Action ^a	Date	Investigation/Removal Action Activities
Investigations and Studies (Continued)		
Historical Radiological Assessment (HRA)	2004	The HRA evaluated and designated sites as radiologically impacted or non-impacted ⁽⁹⁾ . A radiologically impacted site is one that has the potential for radioactive contamination based on historical information, or is known to contain or have contained radioactive contamination. A non-impacted site is one, based on historical documentation or results of previous radiological survey information, where there is no reasonable possibility for residual radioactive contamination. Based on the results of the assessment, the storm drains and sanitary sewers at Parcel UC-2 have a potential for radiological contamination, and further investigation is required.
Feasibility Study – Revised	2008	Existing RI data were combined with new data collected after the RI Reports had been completed. The revised FS considered new information associated with several cleanup actions completed within former Parcel C and at other adjacent parcels at HPS. New information considered and incorporated into the revised FS (including IR-06, which partially overlays Parcel UC-2) included (1) quarterly monitoring of groundwater, (2) updates to toxicity criteria used in the 1997 HHRA, and (3) the findings from removal actions conducted to address chemicals identified by the RMR process and radiological contaminants that were identified by the HRA. Data were summarized and evaluated to refine the site conceptual model, further define the nature and extent of contamination, assess potential risks based on existing site conditions, and develop and evaluate revised alternatives. Data evaluation included (1) a comparison of new and existing data with updated screening criteria, (2) a revised evaluation of groundwater beneficial uses and exposure pathways, and (3) a revised assessment of potential risk posed by exposure to soil and groundwater at former Parcel C. Revised remedial action objectives (RAO) were developed, which included a risk range rather than specific concentrations for contaminants. Remedial alternatives were developed and a detailed and comparative analysis of alternatives was performed.
Radiological Addendum	2008	The primary purpose of this addendum was to provide decision makers with the information necessary to select a final remedy for radiologically impacted buildings, former building sites, outdoor areas, and soils and piping associated with remediated storm drains and sanitary sewers (including those storm drains and sanitary sewers in Parcel UC-2). This information was obtained by developing and evaluating appropriate remedial alternatives. Two remedial alternatives were identified after the screening of general response actions (GRA) and process options: no action, and a combination of surveys, decontamination, excavation, disposal, and release. The two alternatives were analyzed against the nine CERCLA evaluation criteria and against each other.

TABLE 1: PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS (CONTINUED)

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Previous Investigation/ Removal Action ^a	Date	Investigation/Removal Action Activities
Investigations and Studies (Continued)		
Proposed Plan	2009	The Proposed Plan invited the public to review and comment on the Preferred Alternatives for addressing environmental contamination at Parcel UC-2 and the current Parcel C before the final remedy was selected.
Removal Actions		
Removal Action Tank Farm (IR-06)	1990-1993	Ten aboveground storage tanks and associated piping were removed at IR-06, which partially overlays Parcel UC-2. The tanks ranged in size from 12,000 gallons to 2,100,000 gallons and contained diesel fuel, lube oil and solvents.
Storm Drain Sediment Removal	1996-1997	As part of a base-wide removal action, sediments in storm drain lines were removed at Parcel UC-2.
Parcel B Remedial Action (IR-06)	1997-1998	Soil was removed at 19 excavation sites at IR-06, which partially overlays Parcel UC-2. The excavations were sampled and the sites were backfilled.
Facility-Wide Exploratory Excavations	1997-1999	Soil was removed at 18 sites facility-wide, including IR-06, which partially overlays Parcel UC-2. The excavations were sampled, and the sites were backfilled.
Parcel B Remedial Action – Addendum	2000-2001	An industrial drain line between Buildings 123 and 134 (in IR-06, which partially overlays Parcel UC-2) was excavated. About 2,050 cubic yards (cy) of soil was removed, the excavation was sampled, and the site was backfilled.
Parcel B Storm Drain and Sanitary Sewer Removal Action	2008	A total of 1,892 linear feet of pipeline was removed at IR-06 (which partially overlays Parcel UC-2) and IR-25. About 3,086 cy of material was removed. The concrete, clay, and cement pipelines were tested for radiological contamination and disposed of appropriately off site.

Note:

a The documents listed are available in the administrative record and provide detailed information used to support remedy selection at Parcel UC-2.

Because no known sources of chemical contamination are in Parcel UC-2 soil, no soil samples were collected. The Final FS Report for Parcel C concluded that soil conditions in the Parcel UC-2 area can be represented by Hunters Point ambient levels (HPAL). Therefore, the predominant chemicals of concern in Parcel UC-2 soil are **metals**⁽¹⁰⁾. Elevated concentrations of metals such as arsenic, manganese, and nickel are expected for fill material derived from quarried bedrock that was used to build the shipyard in the 1940s. The final Parcel C FS also recommended applying the cover alternative parcel-wide because of the ubiquity of metals at concentrations that exceed remediation goals throughout the former Parcel C, including Parcel UC-2.

The only groundwater remedial unit (RU) at Parcel UC-2 is a portion of RU-C5 (**Figure 6**). The predominant chemicals present in Parcel UC-2 groundwater, based on this portion of RU-C5, are **VOCs**⁽¹¹⁾, and specifically carbon tetrachloride. The highest concentration of carbon tetrachloride that has been detected in groundwater samples from Parcel UC-2 is 28 micrograms per liter (µg/L) in 1993 from a well that is located in the eastern portion of IR-06. In 2007 and 2008, detections of carbon tetrachloride in this area were between 1 and 5 µg/L. The estimated areal extent of carbon tetrachloride in groundwater at Parcel UC-2, and the well with the highest detection of carbon tetrachloride, is shown on **Figure 6**.

The Navy identified **radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures**⁽¹²⁾, including infrastructure at Parcel UC-2 associated with the former use of general radioactive materials and decontamination of ships used during the 1946 atomic weapons testing in the South Pacific. Although there are no radiologically impacted buildings, there are radiologically impacted storm drains and sanitary sewers in Parcel UC-2 (**Figure 7**). The Navy decided to conduct a time-critical removal action (TCRA) to address potential radioactive contamination in storm drains and sanitary sewers at Parcel UC-2. The TCRA at Parcel UC-2 involved (1) excavating radiologically impacted storm drain and sanitary sewer lines; and (2) screening, separating, and disposing of radioactively contaminated excavated materials at an off-site, low-level radioactive waste facility. Survey and removal of the Parcel UC-2 storm drain and sanitary sewer lines were completed in early October 2009. The draft radiological survey unit report is planned for early spring in 2010. Although the TCRA may not be completed by the time the ROD is signed, the TCRA is intended to achieve cleanup goals that are identical to the RAOs identified in this ROD. In the event that the TCRA does not achieve its cleanup goals, cleanup will continue in accordance with the remedial action selected in this ROD until the RAOs are achieved.

2.4 CURRENT AND POTENTIAL FUTURE SITE USES

The Parcel UC-2 **reuses**⁽¹³⁾ (**mixed-use and research and development**) specified in the San Francisco Redevelopment Agency's 1997 reuse plan were evaluated for the residential exposure scenario. The groundwater in the A-aquifer, as discussed in the revised FS, is not suitable for use as drinking water. Additionally, drinking water standards do not apply to the A-aquifer or the upper bedrock water bearing zone when it is the uppermost groundwater unit. Exposures to the A-aquifer were evaluated based on indoor air inhalation and transport to the San Francisco Bay.

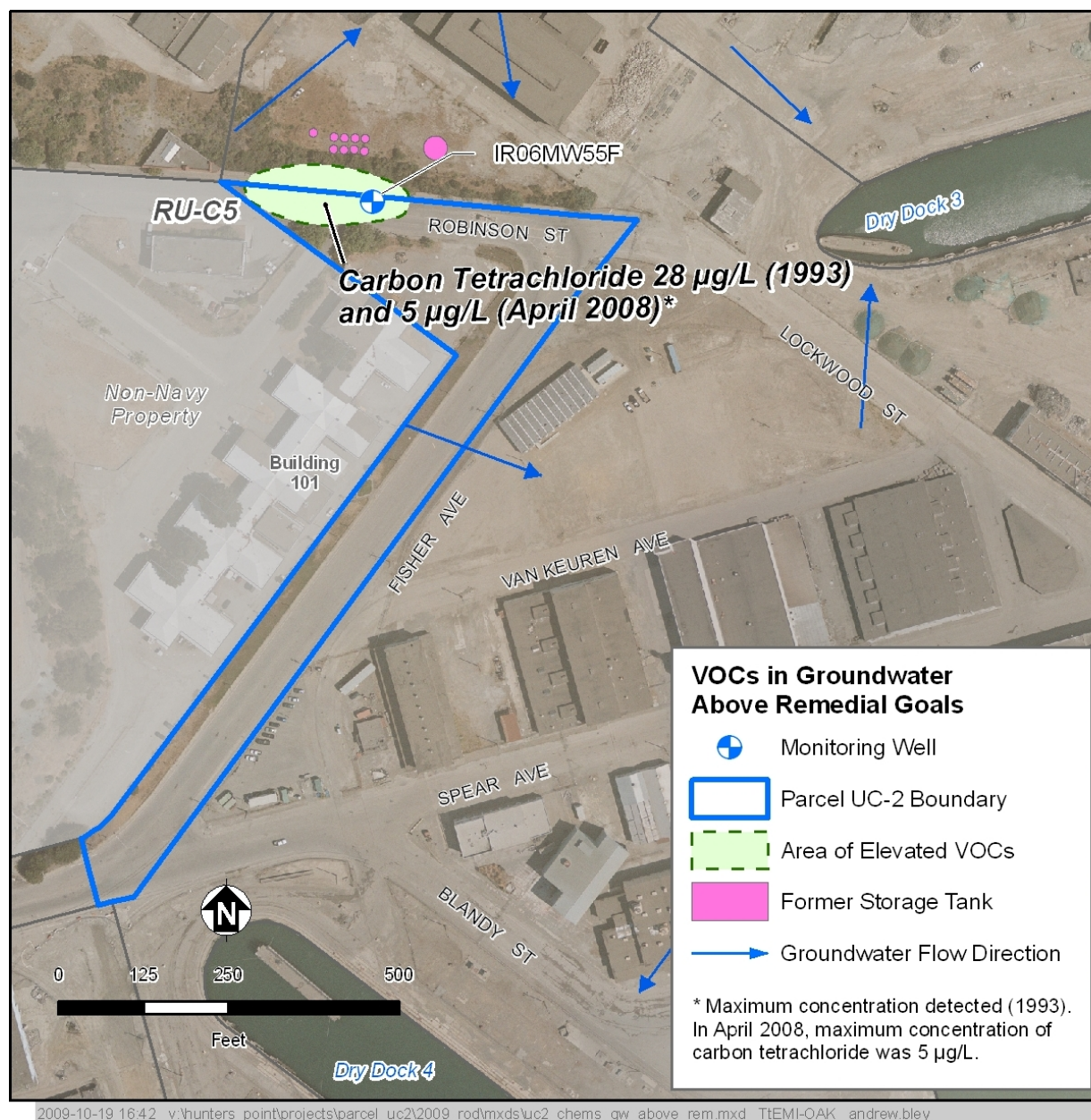


Figure 6. VOCs in Groundwater Above Remedial Goals

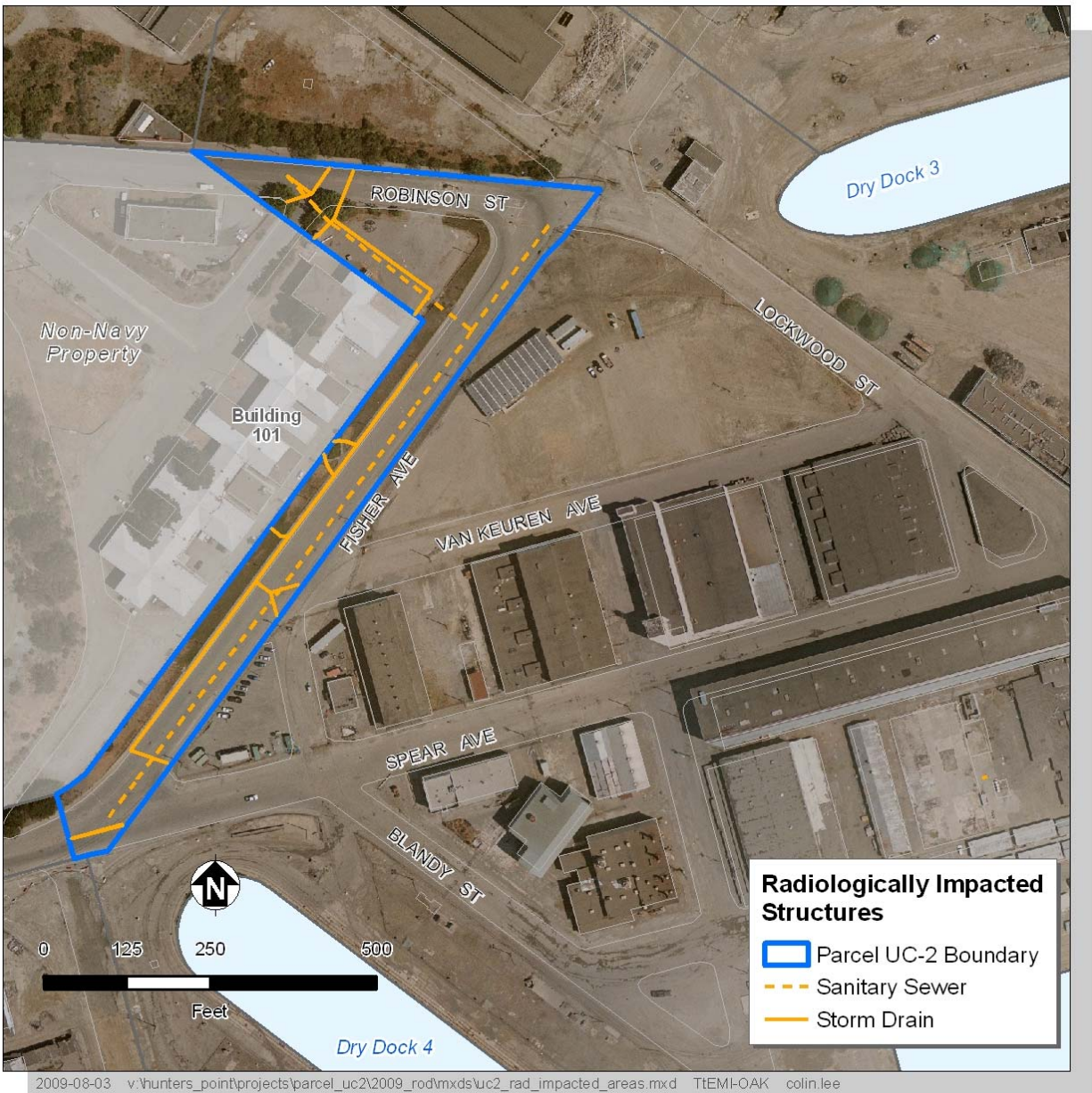


Figure 7. Radiologically Impacted Structures (Storm Drains and Sanitary Sewers)

2.5 SUMMARY OF SITE RISKS

The source of potential contamination at Parcel UC-2 is attributed to industrial and radiological research activities by the Navy or other tenants, and to several metals, such as arsenic, manganese, and nickel, expected at ambient concentrations in the local serpentine bedrock. The primary fate and transport mechanisms include volatilization, wind suspension, migration of contaminants via infiltration and percolation into subsurface soil and groundwater, transport and discharge of metals in groundwater to the San Francisco Bay, and root uptake. A general conceptual site model (CSM) for Parcel UC-2 is provided on [Figure 8](#). Based on the CSM, Parcel UC-2 was evaluated for potential risks to human health and the environment in the Revised FS Report and its radiological addendum. The risk assessment results can be applied by focusing on the redevelopment blocks within the parcel. Results of the HHRA are presented in [Section 2.5.1](#).

During the RI, the Navy concluded that limited viable habitat is available for terrestrial wildlife at Parcel UC-2 because the majority of the site is covered with pavement. Therefore, ecological risk associated with exposure to soil was not evaluated further. Furthermore, even if the future reuse of Parcel UC-2 were to change to open space/recreational, soil covers would protect terrestrial wildlife from risks posed by exposure to contaminants left below the cover. A screening evaluation of groundwater was conducted in the revised Final FS Report to evaluate potential risks to aquatic wildlife in San Francisco Bay. Results of that evaluation are summarized in [Section 2.5.2](#).

2.5.1 Human Health Risk Assessment

Based on a [human health CSM_{\(14\)}](#), a quantitative [HHRA_{\(15\)}](#) was completed for former Parcel C for exposure to surface soil, subsurface soil, groundwater, and vapor intrusion via groundwater. Potential [cancer risks and noncancer hazards_{\(16\)}](#) were calculated based on reasonable maximum exposure (RME) assumptions recommended by EPA and DTSC. These assumptions are based on an RME rather than an average or medium-range exposure assumption and provide a conservative and protective approach that estimates the highest health risks that are reasonably expected to occur at a site. Actual risks from exposures to chemicals in soil and groundwater at Parcel UC-2 are likely to be lower.

To assess risk, the Base Realignment and Closure Cleanup Team agreed to divide all of HPS into two types of exposure areas (residential and industrial grids) as a method of statistically calculating risk within an area for various future land use scenarios based on RME. The final FS used these exposure areas and the redevelopment blocks as the basis for evaluating the results of the HHRA and developing remedial alternatives to address potential unacceptable risk at Parcel UC-2.

To help characterize cancer risk, the Navy adopted a conservative approach at Parcel UC-2 and evaluated action for risks greater than 10^{-6} . Acceptable exposure levels for known or suspected carcinogens are generally concentration levels that represent an excess upper-bound lifetime cancer risk to an individual between 10^{-4} (a 1 in 10,000 chance of developing cancer) and 10^{-6} (a 1 in 1,000,000 chance of developing cancer) using information on the relationship between dose and response. The 10^{-6} risk level is used as the point of departure for establishing cleanup goals for alternatives when applicable or relevant and appropriate requirements (ARAR) are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.



Future Construction Worker

Exposure to subsurface soil via incidental ingestion, dermal contact, exposure to A-aquifer groundwater via inhalation and dermal contact; exposure to external radiation and re-suspended contaminated dust from radiologically impacted sewer and storm drains.



Future Resident

Exposure to surface and subsurface soil via incidental ingestion, dermal contact, inhalation, and ingestion of homegrown produce; inhalation exposure to A-aquifer groundwater via vapor intrusion; exposure to external radiation and re-suspended contaminated dust from radiologically impacted sewer and storm drains.

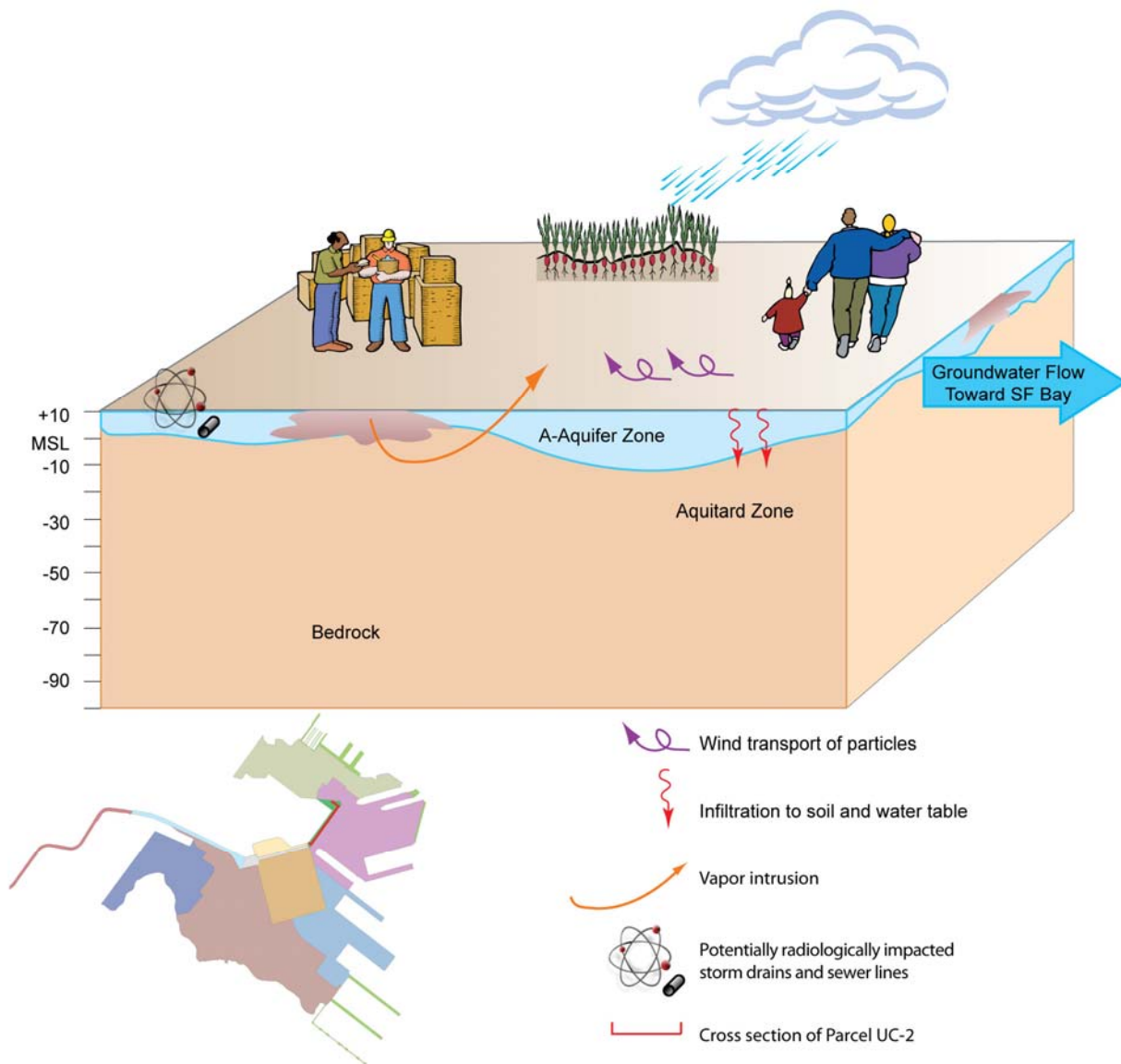


Figure 8. Conceptual Site Model

Both **total and incremental risks**⁽¹⁷⁾ were evaluated for exposure to soil. All detected chemicals, including naturally occurring metals from the serpentine bedrock-derived fill material, were included as chemicals of potential concern for the total risk evaluation, regardless of their concentration. Only the essential nutrients calcium, magnesium, potassium, and sodium were not included as chemicals of potential concern. The total risk evaluation estimates the risks posed by chemicals at the site, including those present at concentrations at or below ambient levels. The essential nutrients were excluded as chemicals of potential concern in soil for the incremental risk evaluation, as well as the detected metals with maximum measured concentrations below the HPAL. The incremental risk evaluation estimates risks posed by metals present at the site that are above the estimated ambient levels.

Potential unacceptable risks include cancer risks and noncancer hazards for future receptors from exposure to soil or groundwater, as discussed below. Potential unacceptable risk is defined as an ELCR of greater than 10^{-6} or a segregated hazard index (HI) greater than 1, as calculated by the incremental risk evaluation.

The CERCLA process did not identify specific impacts to soil in Parcel UC-2. However, elevated concentrations of metals such as arsenic and manganese are found in soil at HPS and may be related to the bedrock fill quarried to build the shipyard in the 1940s. At ambient concentrations (that is, HPALs), some metals at HPS are associated with cancer risks in excess of 10^{-6} and noncancer hazards in excess of 1.0. For example, the cancer risk associated with residential exposure to arsenic at a concentration equal to the HPAL for arsenic (11.1 mg/kg) is 2.9×10^{-4} . The HI associated with residential exposure to manganese at a concentration equal to the HPAL for manganese (1,431 mg/kg) is 1.7. Collectively, all metals at ambient levels contribute to a cancer risk of 3×10^{-4} for a resident and of 3×10^{-5} for industrial workers and recreators. For noncancer hazards, metals at ambient levels collectively contribute to an HI of 11 for residents, 0.2 for industrial workers, and 0.7 for recreators. Although no soil data were collected within Parcel UC-2, some of the risk grids for the construction worker include the northern border of Parcel UC-2. Based on the **revised HHRA results**⁽¹⁸⁾ for soil, these chemical cancer risks are estimated to be greater than 10^{-6} (see Table 2). Potential cancer risks from soil are based on ingestion or contact with arsenic and radionuclides.

The risk assessment for groundwater estimated cancer risk greater than 10^{-6} and a noncancer hazard greater than 1 in the portion of redevelopment block 10 that intersects Parcel UC-2 (see Table 2). Potential risks from groundwater are based on breathing VOC vapors in indoor air that may have migrated through the subsurface from groundwater in the A-aquifer. The primary COC in groundwater from the vapor intrusion pathway is carbon tetrachloride. In addition, the HHRA results for groundwater show that the risk to the construction worker from exposure to the A-aquifer groundwater via dermal exposure and inhalation exceeds the cancer risk threshold of 10^{-6} in areas with elevated concentrations of the COCs.

Additionally, **radiological risk**⁽¹⁹⁾ was calculated based on estimated concentrations of radiological contamination at radiologically impacted sanitary sewer lines and storm drains, using remediation goals for each radionuclide of concern. Actual calculated risk will be based on field measurements after final status survey results have been received for each impacted site. **Combined chemical and radiological risk**⁽²⁰⁾ was also summed to estimate the overall potential risk to human health associated with a site.

The HHRA specifies the **assumptions and uncertainties**⁽²¹⁾ inherent in the risk assessment process based on the number of samples collected or their location, the literature-based exposure and toxicity values used to calculate risk, and risk characterization across multiple media and exposure pathways. The effects of uncertainties are overestimation or underestimation of the actual cancer risk or HI. In general, the risk assessment process is based on the use of conservative (health-protective) assumptions that, when combined, are intended to overestimate the actual risk.

TABLE 2: CANCER RISKS AND NONCANCER HAZARDS

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Redevelopment Block	Exposure Scenario	Cancer Risk ^a		Noncancer Hazard Index
		Chemical	Radiological ^b	
Soil				
10	Residential	Not quantified ^c	5 x 10 ⁻⁵	Not quantified ^c
17	Residential	Not quantified ^c	5 x 10 ⁻⁵	Not quantified ^c
10	Construction	4 x 10 ⁻⁴	Not evaluated ^d	<1
17	Construction	Not quantified ^c	Not evaluated ^d	Not quantified ^c
Redevelopment Block	Exposure Scenario		Chemical Cancer Risk	Noncancer Hazard Index
A-Aquifer: Risk based on Vapor Intrusion				
10	Residential		6 x 10 ⁻⁴	14

Notes:

- a Listed risk value is the maximum in the redevelopment block. The redevelopment block and associated reuse are based on the "Hunters Point Shipyard Redevelopment Plan." Reuse areas and development blocks may change in the future.
- b Maximum radiological risk is based on the sanitary sewers and storm drains within Parcel UC-2.
- c Although no soil data were collected within Parcel UC-2, elevated concentrations of metals such as arsenic and manganese are found in the soil at HPS.
- d The radiological risk assessment did not evaluate construction worker exposure but instead considered residential exposure as the most conservative (protective) scenario.

2.5.2 Ecological Risk Assessment

As previously stated, the Navy concluded during the RI that limited viable habitat is available for terrestrial wildlife at Parcel UC-2 because most of the site is covered with pavement. Specifically, the RI concludes that "Parcels C and D are almost entirely paved except for small pockets of vegetation which are not considered suitable habitat for animal life." Therefore, ecological risk associated with exposure to soil was not evaluated further in the Revised FS Report.

Chemicals present in the A-aquifer groundwater at Parcel UC-2 were evaluated to assess potential **environmental impacts to the San Francisco Bay**⁽²²⁾. Based on the evaluation results, no chemicals were identified as ecological COCs in the A-aquifer at Parcel UC-2.

2.5.3 Basis for Response Action

The response action selected in this ROD is necessary to protect the public health, welfare, or the environment from actual or potential releases of hazardous substances into the environment. The Navy, in partnership with EPA, DTSC, and the Water Board, considered all pertinent factors in accordance with CERCLA and the NCP remedy selection criteria and concluded that remedial action is necessary to address **soil**⁽²³⁾, **groundwater**⁽²⁴⁾, and **radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures**⁽²⁵⁾ at Parcel UC-2. This determination was made because:

- Based on the limited HHRA results for soil and the general presence of artificial fill, chemical cancer risks are estimated to be greater than 10^{-6} at Parcel UC-2 (see [Table 2](#)).
- Before the affected structures (storm drains and sanitary sewers) were removed, radiological risks for soil and structures (storm drains and sanitary sewers) were greater than 10^{-6} across Parcel UC-2.
- Based on the general presence of artificial fill, the noncancer hazard is estimated to exceed 1 across Parcel UC-2.
- The risk assessment for groundwater estimated cancer risks greater than 10^{-6} and noncancer hazards greater than 1 in the RU-C5 plume that intersects the northern border of Parcel UC-2.
- Potential risks from groundwater are based on breathing VOC vapors in indoor air that may have migrated through the subsurface from groundwater in the A-aquifer.
- HHRA results for groundwater show that the risk from exposure to the A-aquifer groundwater via dermal exposure and inhalation to the construction workers exceeds the cancer risk threshold of 10^{-6} in areas with elevated concentrations of the COCs.

The concentrations of COCs for soil and groundwater that would require a response action are summarized in [Table 3](#). **Radionuclides of concern**⁽²⁶⁾ for the sanitary sewers and storm drains are cesium-137, radium-226, and strontium-90. [Figures 9 and 10](#) show the areas where remedial actions for soil and groundwater would occur.

TABLE 3: CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER REQUIRING A RESPONSE ACTION
Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Exposure Scenario ^a	Chemical of Concern	Maximum Detected Concentration
Soil (mg/kg)		
Residential	Arsenic	11.1 ^b
	Manganese	1,431 ^b
Construction Worker	Arsenic	11.1 ^b
	Manganese	1,431 ^b
Groundwater (µg/L)		
Residential – Vapor Intrusion (A-Aquifer)	Carbon Tetrachloride	28 ^c
	Chloroform	11 ^c
	Trichloroethene	14 ^c
Construction Worker (A-Aquifer)	Carbon Tetrachloride	28 ^c

Notes:

- a Exposures in the residential and construction worker scenarios consider exposure to soil from 0 to 10 feet below ground surface (bgs).
- b Although no soil data were collected within Parcel UC-2, soil conditions can be represented by Hunters Point ambient levels (HPAL), which indicate that elevated concentrations of metals such as arsenic (11.1 mg/kg) and manganese (1,431 mg/kg) are present.
- c Maximum concentrations in groundwater from the most recent groundwater monitoring event (April 2008) are as follows: carbon tetrachloride (5 µg/L), chloroform (2.5 µg/L), and trichloroethene (0.5 µg/L).
- µg/L Micrograms per liter
mg/kg Milligrams per kilogram

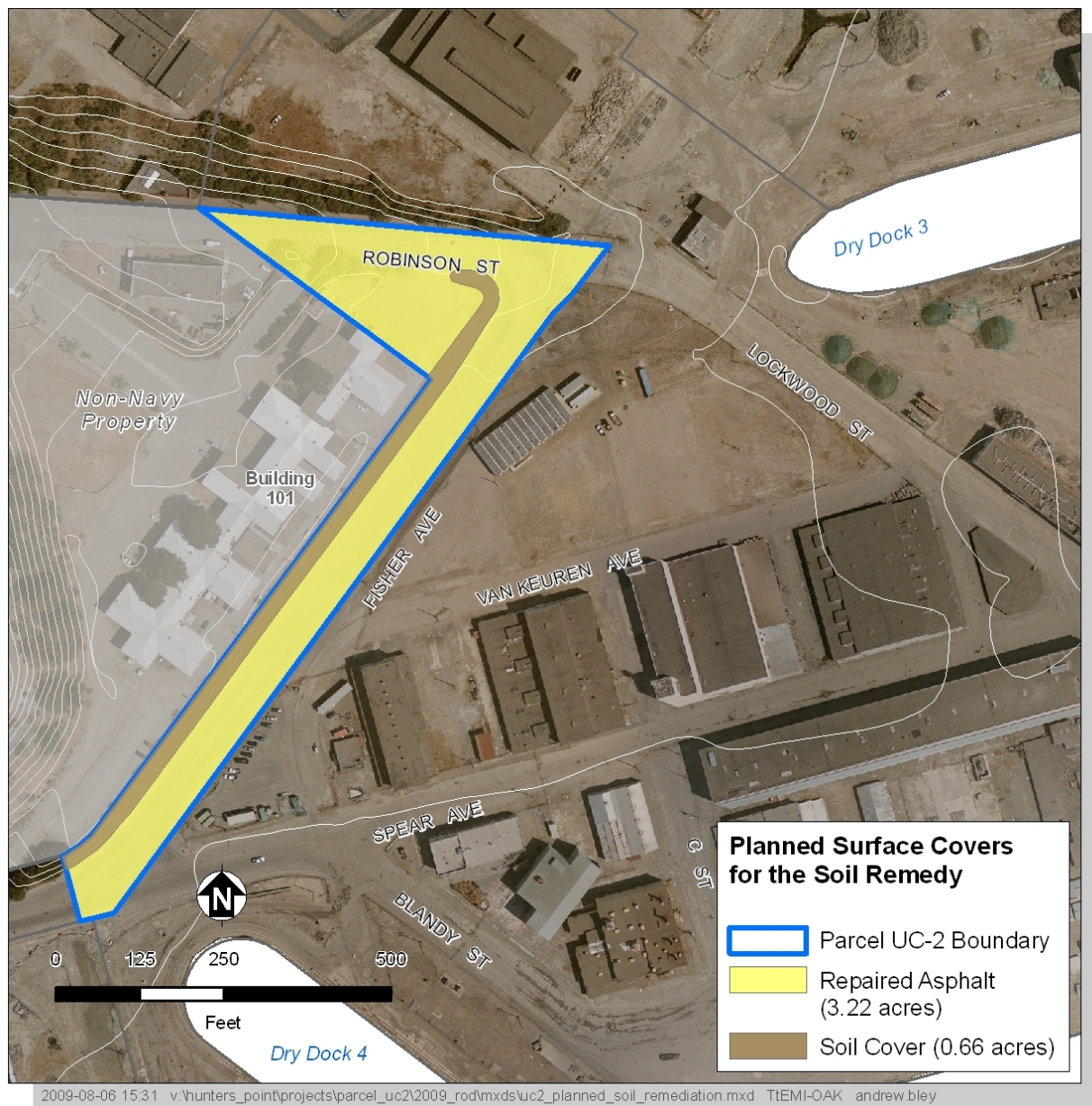


Figure 9. Planned Surface Covers for the Soil Remedy

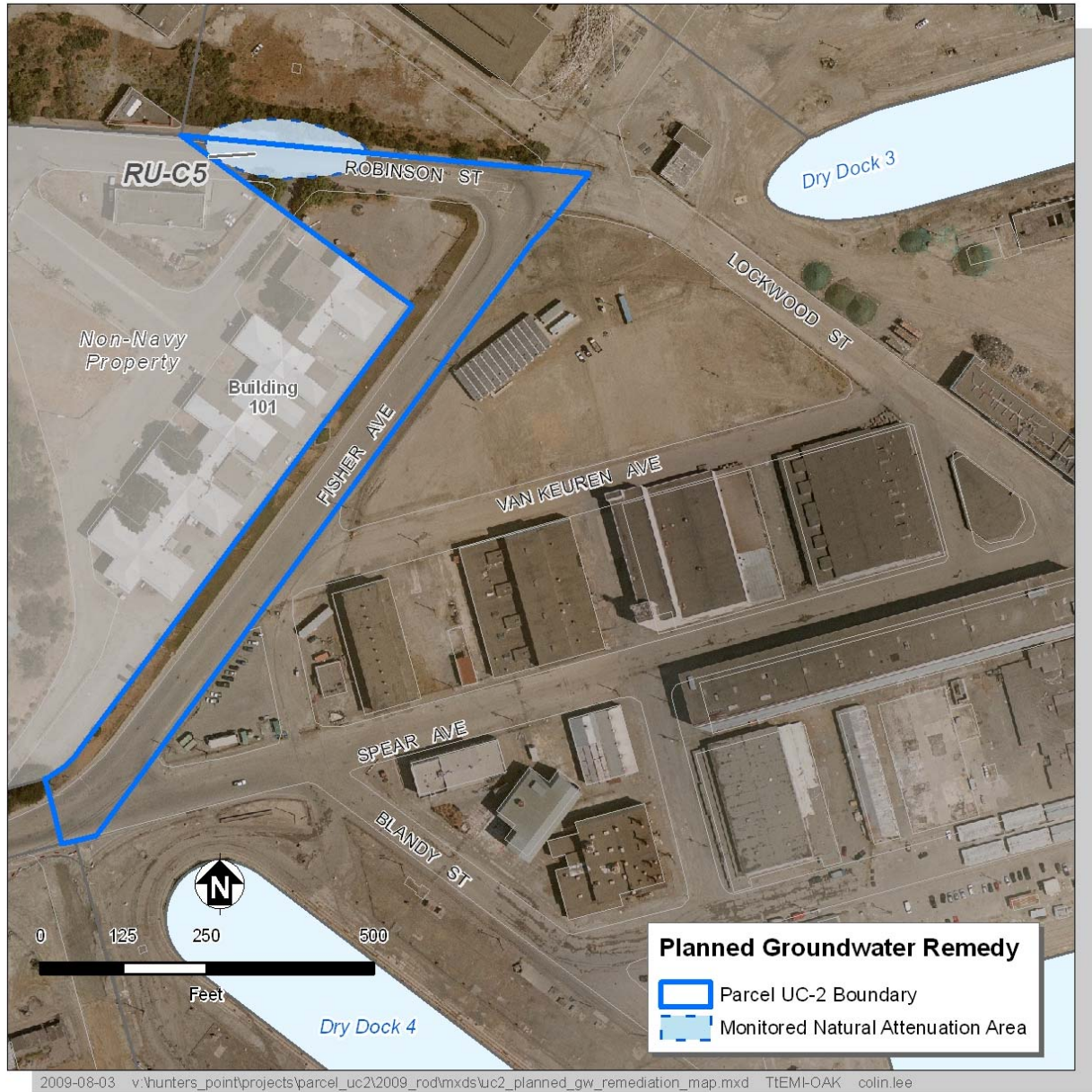


Figure 10. Planned Groundwater Remedy

2.6 PRINCIPAL THREAT WASTE

Although a remedial response action is necessary (Section 2.5.3), there are no wastes in Parcel UC-2 that constitute a “principal threat.” Principal threat wastes are hazardous or highly toxic source materials that result in ongoing contamination to surrounding media, that generally cannot be reliably contained, or that present a significant risk to human health or the environment should exposure occur. Although elevated concentrations of some metals and radionuclides are present in soil and structures (storm drains and sanitary sewers), the potential risks do not suggest there is a principal threat waste in soil at Parcel UC-2. Contaminated groundwater is not generally considered source material unless it has the potential to be extremely mobile. Based on a review of the data, VOCs in groundwater at Parcel UC-2 appear to be somewhat stable, showing a minimal expansion of the associated plumes over time. In addition, a variety of processes occur in the subsurface that serve to reduce chemical concentrations in groundwater as groundwater migrates toward a discharge point such as the San Francisco Bay. These processes include hydrodynamic dispersion, sorption, chemical and biological transformation, dilution in the tidal mixing zone, and dilution on discharge to a surface water body. Therefore, VOCs (most significantly carbon tetrachloride) in groundwater at Parcel UC-2 are not considered a principal threat waste.

2.7 REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAO)⁽²⁷⁾ are established based on attainment of regulatory requirements, standards, and guidance; contaminated media; COCs; potential receptors and exposure scenarios; and human health and ecological risks. Ultimately, the success of a remedial action is measured by its ability to meet the RAOs. Planned future land use is an important component in developing RAOs, and the RAOs for Parcel UC-2 are based on the San Francisco Redevelopment Agency’s 1997 reuse plan. The RAOs for Parcel UC-2 were developed in conjunction with the regulatory agencies and are listed below by medium.

- **Soil RAOs:**

1. Prevent or minimize exposure to inorganic chemicals in soil at concentrations above remediation goals developed in the HHRA for the following exposure pathways:
 - (a) Ingestion of, outdoor inhalation of, and dermal exposure to surface and subsurface soil
 - (b) Ingestion of homegrown produce by residents in mixed-use and research and development blocks
2. Prevent or minimize exposure to VOCs in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors. Remediation goals for VOCs to address exposure via indoor inhalation of vapors may be superseded based on COC identification information from future soil gas surveys. Future action levels would be established for soil gas, would account for vapors from both soil and groundwater, and would be calculated based on a cumulative risk level of 10^{-6} using the accepted methodology for risk assessments at HPS.

- **Groundwater RAOs:**

1. Prevent or minimize exposure to VOCs in the A-aquifer groundwater at concentrations above remediation goals via indoor inhalation of vapors from groundwater.
2. Prevent or minimize direct exposure to the groundwater that may contain COCs through the domestic use pathway (for example, drinking water or showering).
3. Prevent or minimize exposure of construction workers to VOCs in the A-aquifer groundwater at concentrations above remediation goals from dermal exposure and inhalation of vapors from groundwater.

- **Radiologically Impacted Structures (storm drains and sanitary sewers) and Soil (associated with these structures) RAOs:**

1. Prevent or minimize exposure to radionuclides of concern in concentrations that exceed remediation goals for all potentially complete exposure pathways (for example, external radiation, soil ingestion, and inhalation of resuspended radionuclides in soil or dust).

Remediation goals for soil and groundwater are listed in [Table 4](#). Remediation goals for radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures are listed in [Table 5](#).

TABLE 4: REMEDIATION GOALS FOR SOIL AND GROUNDWATER

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Exposure Scenario ^a	Chemical of Concern	Remediation Goal / Basis ^{b,c}
Soil^d		
Residential	Arsenic	11.1 / HPAL
	Manganese	1,431 / HPAL
Construction Worker	Arsenic	11.1 / HPAL
	Manganese	6,900 / RBC
Groundwater^e		
Residential – Vapor Intrusion (A-Aquifer)	Carbon Tetrachloride	0.5 / PQL
	Chloroform	1.0 / PQL
	Trichloroethene	2.9 / RBC
Construction Worker (A-Aquifer)	Carbon Tetrachloride	15 / RBC

Notes:

- a Exposures in the residential and construction worker scenarios consider exposure to soil from 0 to 10 feet below ground surface.
- b Soil remediation goals are in milligrams per kilogram.
- c Groundwater remediation goals are in micrograms per liter.
- d Although no soil data were collected within Parcel UC-2, soil conditions can be represented by HPAL. Maximum concentrations of metals such as arsenic and manganese are expected to exceed the soil remediation goal.
- e Remediation goals for volatile organic compounds to address exposure via indoor inhalation of vapors may be superseded based on chemicals of concern identification information from future soil gas surveys. These future action levels would be established for soil gas, would account for vapors from both soil and groundwater, and would be calculated based on a cumulative risk level of 10^{-6} using the accepted methodology for risk assessments at the HPS.

PQL Practical quantitation limit
RBC Risk-based concentration

TABLE 5: REMEDIATION GOALS FOR RADIONUCLIDES

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Radionuclide ^a	Surfaces (dpm/100 cm ²)		Soil (pCi/g) ^d	Water (pCi/L)
	Equipment and Waste ^b	Structures ^c		
Cesium-137	5,000	5,000	0.113	119
Radium-226	100	100	1 ^e	5
Strontium-90	1,000	1,000	0.331	8

Notes:

- a Unless otherwise stated, the radiological remediation goals in this table are based on total activity per sample including the background.
- b Limits for removable surface activity are 20 percent of these values.
- c Structures consist of storm drains and sanitary sewers. Remediation goals are consistent with those issued in the Radiological TCRA Action Memorandum. Remediation goals meet the 25 mrem/yr residual dose level consistent with 10 CFR Section 20.1402. Furthermore, goals meet the 15 mrem/yr residual dose level for most radionuclides of concern, consistent with the 1997 EPA OSWER Directive (OSWER No. 9200.4-18).
- d All radiologically impacted soils will be remediated according to residential remediation goals.
- e Goal is 1 pCi/g above background per agreement with EPA.

CFR	<i>Code of Federal Regulations</i>
dpm/100cm ²	Disintegration per minute per one hundred square centimeters
EPA	U.S. Environmental Protection Agency
millirem	One thousandth of a rem (10 ⁻³)
mrem/yr	Millirem per year
OSWER	Office of Solid Waste and Emergency Response
pCi/g	Picocurie per gram
pCi/L	Picocurie per liter
TCRA	Time-Critical Removal Action

2.8 DESCRIPTION AND EVALUATION OF REMEDIAL ALTERNATIVES

To address contamination in soil and groundwater and radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures, preliminary screening of [GRAs_{\(28\)}](#) and process options was completed to refine the remedy selection process, as detailed in the revised Final FS Report. The GRAs were also developed considering the planned future land use of each redevelopment block because the RAOs were developed based on the planned future land use. Five soil, five groundwater, and two radiological remedial approaches were retained as combinations of [preliminary remedial alternatives_{\(29\)}](#) and were evaluated with respect to implementability, effectiveness, and relative cost (high, moderate, and low). Detailed cost analysis was not performed as part of this preliminary screening.

Five remedial alternatives for soil, five remedial alternatives for groundwater, and two remedial alternatives for radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures were retained for a detailed comparative analysis in accordance with the NCP.

2.8.1 Description of Remedial Alternatives

The feasibility study was conducted for the former Parcel C, which consisted of the current Parcels UC-2 and C. Parcel UC-2 was a small, non-industrial portion of the former Parcel C. The former Parcel C was subsequently split into the current Parcels C and UC-2 at the proposed plan stage of the CERCLA process. Evaluation of risk, development of remedial action objectives, and evaluation of remedial alternatives as documented in the final feasibility study pertain to both the current Parcel C and UC-2; as such, only a subset of the soil and groundwater remedy components evaluated in the FS are applicable to the Parcel UC-2 portion of the former Parcel C.

The relevant remedy components are as follows:

- ICs, maintained landscaping, and covers for soil
- ICs, long-term monitoring, and MNA for groundwater.

The following remedy components in the soil and groundwater alternatives are not relevant for the Parcel UC-2 portion of the former Parcel C, and therefore are not applicable to Parcel UC-2:

- Excavation, off-site disposal, and soil vapor extraction (SVE) for soil.
- In situ zero-valent iron (ZVI) reduction and bioremediation for groundwater.

Only the relevant remedy components for Parcel UC-2 are presented and evaluated in this ROD. The relevant soil and groundwater remedy components for Parcel UC-2 are summarized in [Table 6](#).

[Table 7](#) provides the major components, details, and cost of each remedial alternative for Parcel UC-2 identified for soil, groundwater, and radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures.

2.8.2 Comparative Analysis of Alternatives

A comparative analysis of alternatives with respect to the [nine evaluation criteria](#)⁽³⁰⁾ was completed and is provided below. [Table 8](#) depicts a relative ranking of the alternatives.

Threshold Criteria

Overall Protection of Human Health and the Environment. The no-action alternatives for soil, groundwater, and radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures do not achieve RAOs; therefore, they do not protect human health and the environment and are not considered further in this ROD. For soil, Alternatives S-2/3 and S-4/5 are protective of human health and the environment under the anticipated future land use of the site, although the degree of protection varies between the alternatives. For groundwater, Alternatives GW-2 and GW-3/4 are also protective of human health and the environment, although the degree of protection varies between the alternatives. For radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures, Alternative R-2 is protective of human health and the environment because it includes remediation that reduces exposure to radionuclides of concern.

TABLE 6: SUMMARY OF PARCEL UC-2 REMEDIAL ALTERNATIVES AND REMEDY COMPONENTS
Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Medium	UC-2 ROD Alternative	FS Alternative ^a	Relevant Remedy Components for Parcel UC-2	Remedy Components not Relevant for Parcel UC-2 (not evaluated in ROD)
Soil	S-1	S-1	Existing Soil	
	S-2/3	S-2	ICs, Maintained Landscaping	
		S-3	ICs, Maintained Landscaping	Excavation, Off-site Disposal
	S-4/5	S-4	ICs, Install Covers	
		S-5	ICs, Install Covers	Excavation, Off-site Disposal, SVE
Groundwater	GW-1	GW-1	Existing Groundwater	
	GW-2	GW-2	ICs, Groundwater Monitoring	
	GW-3/4	GW-3(A&B)	ICs, Monitored Natural Attenuation	ZVI reduction, bioremediation
		GW-4	ICs, Monitored Natural Attenuation	ZVI reduction, plume-wide bioremediation
Radiologically Impacted Structures and Soil	R-1	R-1	Existing Structures and Soil	
	R-2	R-2	Survey, Decontamination, Excavation, Disposal	

Note:

- a The Feasibility Study (FS) for the former Parcel C developed five soil remedy alternatives (S-1 through S-5) and five groundwater remedy alternatives (GW-1 through GW-4). Only relevant remedy components for Parcel UC-2 were evaluated. The following remedy alternatives for Parcel UC-2 are equivalent and were combined for evaluation: S-2/3 (S-2 and S-3), S-4/5 (S-4 and S-5), and GW-3/4 (GW-3A, GW-3B, and GW-4).

TABLE 7: REMEDIAL ALTERNATIVES

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Remedial Alternative ^a	Components	Details	Cost ^b
Soil Remedial Alternatives			
S-1: No Action <i>No action for contaminated soil with no restriction on activities.</i>	Existing soil	No action	No cost
S-2/3: ICs and Maintained Landscaping <i>Impose ICs to limit land use and maintain landscaping of bare or disturbed areas with no cover.</i>	<ul style="list-style-type: none"> ICs Maintained landscaping 	<ul style="list-style-type: none"> ICs, including proprietary controls, restrictive covenants, restricted land use, restricted activities, and prohibited activities, will be implemented to prevent or minimize exposure to areas where potential unacceptable risk is posed by COCs in soil. The site would be fenced before redevelopment, except for areas that are covered with a building footprint or existing cover (such as a parking lot). Maintain landscaping for bare or minimally vegetated areas that have been disturbed by excavation or construction and not restored with a cover. ICs would prohibit construction of new or reuse of buildings over VOC plumes unless sufficient measures are taken to prevent or minimize exposure to VOCs in soil or groundwater. 	Capital Cost: \$84,000 O&M Cost: \$123,000 Present-Worth Cost: \$248,000_{(31) (32)} Discount Rate: 3.0% Timeframe: 30 years Note: These costs were adapted from the former Parcel C costs and represent approximately 16 percent of the original costs for the former parcel. The present-worth cost includes a 20 percent contingency cost. The actual costs associated with this remedial alternative are within the -30/+50 percent range of the stated present worth cost, as discussed in the original Parcel C FS.

TABLE 7: REMEDIAL ALTERNATIVES (CONTINUED)

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Remedial Alternative ^a	Components	Details	Cost ^b
S-4/5: Covers and ICs <i>Install physical barriers, such as covers, to block exposure pathways to contaminated soil, followed by ICs.</i>	<ul style="list-style-type: none"> Install covers ICs (S-2/3) 	<ul style="list-style-type: none"> Install durable covers that will not break, erode, or deteriorate such that the underlying soil becomes exposed. Existing asphalt and concrete surfaces may be used as covers as long as they meet the durability requirement. All asphalt covers will be sealed at the start of construction and maintained by resealing once every 10 years or as needed to prevent or minimize opening an exposure pathway. The ground would be covered with a minimum of 4 inches of asphalt paving (industrial areas) or 2 feet of new soil (residential areas). Because of the steep slope, the type and thickness of the soil cover will be established in the remedial design (RD). Approximately 0.7 acre would be covered with soil and maintained landscaping and 3.2 acres of existing asphalt and concrete surfaces would be used and repaired as necessary. Impose same ICs as those for Alternative S-2/3. 	Capital Cost: \$208,000 O&M Cost: \$140,000 Present-Worth Cost: \$418,000_{(33) (34)} Discount Rate: 3.0% Timeframe: 30 years Note: These costs were adapted from the former Parcel C costs and represent approximately 6 percent of the original costs for the former parcel. The present-worth cost includes a 20 percent contingency cost. The actual costs associated with this remedial alternative are within the -30/+50 percent range of the stated present worth cost, as discussed in the original Parcel C FS.

TABLE 7: REMEDIAL ALTERNATIVES (CONTINUED)

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Remedial Alternative ^a	Components	Details	Cost ^b
Groundwater Remedial Alternatives			
GW-1: No Action <i>No action for contaminated groundwater with no restriction on activities.</i>	Existing groundwater	No action	No cost
GW-2: Long-Term Monitoring and ICs <i>Implement monitoring to assess migration of chemicals and ambient conditions, followed by ICs.</i>	<ul style="list-style-type: none"> Groundwater monitoring ICs 	<ul style="list-style-type: none"> Monitor VOCs at strategically located monitoring wells to evaluate whether plumes are stable or mobile. Frequency and duration will be established at a later date. ICs, including property controls, restrictive covenants, restricted land use, restricted and prohibited activities, will be implemented to prevent exposure to groundwater where there is potential unacceptable risk posed by COCs in groundwater. ICs will remain in place until the selected remedial goals are achieved that allow for unlimited use and unrestricted exposure. 	<p>Capital Cost: \$0</p> <p>O&M Cost: \$423,000</p> <p>Present-Worth Cost: \$508,000₍₃₅₎^b</p> <p>Discount Rate: 3.0%</p> <p>Timeframe: 30 years</p> <p>Note: These costs were adapted from the former Parcel C costs and represent approximately 4 percent of the original costs for the former parcel. The present-worth cost includes a 20 percent contingency cost. The actual costs associated with this remedial alternative are within the -30/+50 percent range of the stated present worth cost, as discussed in the original Parcel C FS.</p>

TABLE 7: REMEDIAL ALTERNATIVES (CONTINUED)

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Remedial Alternative ^a	Components	Details	Cost ^b
Groundwater Remedial Alternatives (Continued)			
GW-3/4: Monitored Natural Attenuation, and ICs <i>Monitored natural attenuation (MNA) and ICs</i>	<ul style="list-style-type: none"> MNA ICs (GW-2) 	<ul style="list-style-type: none"> Impose MNA. Impose same ICs as those for Alternative GW-2. The cost for implementation of this alternative is the same as for Alternative GW-2. 	Capital Cost: \$0 O&M Cost: \$423,000 Present-Worth Cost: \$508,000 / \$508,000_{(36) (37)} ^b Discount Rate: 3.0% Timeframe: 30 years Note: These costs were adapted from the former Parcel C costs and represent approximately 2 percent of the original costs for the former parcel. The present-worth cost includes a 20 percent contingency cost. The actual costs associated with this remedial alternative are within the -30/+50 percent range of the stated present worth cost, as discussed in the original Parcel C FS.
Radiologically Impacted Structures (storm drains and sanitary sewers only) and Soil (associated with these structures) Remedial Alternatives			
R-1: No Action <i>No action for radiologically impacted structures (storm drains and sanitary sewers) and soil (associated with these structures) with no restriction on activities.</i>	<ul style="list-style-type: none"> Existing structures (storm drains and sanitary sewers) Existing soil 	No action	No cost

TABLE 7: REMEDIAL ALTERNATIVES (CONTINUED)

Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

Remedial Alternative ^a	Components	Details	Cost ^b
Radiologically Impacted Structures (storm drains and sanitary sewers only) and Soil (associated with these structures) Remedial Alternatives (Continued)			
R-2: Survey, Decontamination, Excavation, Disposal, and Release <i>Survey existing structures (storm drains and sanitary sewers), followed by excavation and off-site disposal of contaminated materials and soil.</i>	<ul style="list-style-type: none"> Survey Decontamination Excavation Disposal Release 	<ul style="list-style-type: none"> No buildings are present at Parcel UC-2. Survey structures (storm drains and sanitary sewers). Excavate storm drain and sanitary sewer lines and radiologically impacted soil associated with these structures. Dispose of excavated materials and soils at off-site facilities. Conduct surveys to ensure that remediation goals are met for all radiologically impacted sites in Parcel UC-2. 	Capital Cost:: \$758,000 O&M Cost: None Present-Worth Cost: \$1,077,000₍₃₈₎ Discount Rate: Not applicable Timeframe: Approximately 1 year Note: These costs were adapted from the former Parcel C costs and represent approximately 4 percent of the original costs for the former parcel. The present-worth cost includes a 20 percent contingency cost. The actual costs associated with this remedial alternative are within the -30/+50 percent range of the stated present worth cost, as discussed in radiological addendum to the original Parcel C FS.

Notes:

- a The Feasibility Study (FS) for the former Parcel C developed five soil remedy alternatives (S-1 through S-5) and five groundwater remedy alternatives (GW-1 through GW-4). Only relevant remedy components for Parcel UC-2 were evaluated in this ROD. The following remedy alternatives for Parcel UC-2 are equivalent and were combined for evaluation: S-2/3 (S-2 and S-3), S-4/5 (S-4 and S-5), and GW-3/4 (GW-3A, GW-3B, and GW-4).
- b Parcel UC-2 represents a small percentage of the original Parcel C acreage (approximately 3 percent), and only a limited set of soil and groundwater response actions applicable at Parcel C are relevant remedy components for Parcel UC-2 (ICs, maintained landscaping, and covers for soil; ICs, long-term monitoring, and monitored natural attenuation [MNA] for groundwater). Based on this understanding, the Parcel UC-2 costs for Alternatives S-2, S-4, and GW-2 were evaluated in detail and were found to be 16 percent for Alternative S-2, 3 percent for Alternative S-4, and 4 percent for Alternative GW-2 of the overall Parcel C costs. The adjusted Parcel UC-2 Alternative S-2 costs were used to adjust the Alternative S-2/3 costs, and the adjusted Parcel UC-2 Alternative S-4 costs were used to adjust the Alternative S-4/5 costs. The adjusted Parcel UC-2 Alternative GW-2 costs were used to adjust the costs for Alternative GW-3/4. These adjusted Parcel UC-2 costs were compared with the original Parcel C cost for each of these alternatives, and a percentage was calculated.
- c The present worth costs for implementing Alternatives GW-2 and GW-3/4 (\$508,000) are equivalent.

TABLE 8: RELATIVE RANKING OF REMEDIAL ALTERNATIVES
Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California

CERCLA Criteria	Soil ^a			Groundwater ^a			Radiologically Impacted Structures (storm drains and sanitary sewers) and Soil (associated with these structures)	
	S-1 No Action	S-2/3 ICs and Maintained Landscaping	S-4/5* Covers and ICs	GW-1 No Action	GW-2 Long-Term Monitoring and ICs	GW-3/4* Monitored Natural Attenuation, and ICs	R-1 No Action	R-2* Survey, Decontamination, Excavation, Disposal, and Release
Threshold Criteria								
Overall Protection of Human Health and the Environment	No	Yes	Yes	No	Yes	Yes	No	Yes
Compliance with ARARs	N/A	Yes	Yes	N/A	Yes	Yes	N/A	Yes
Balancing Criteria								
Long-Term Effectiveness and Permanence								
Reduction in Toxicity, Mobility, or Volume through Treatment								
Short-Term Effectiveness								
Implementability								
Present-Worth Cost (\$)	\$0	\$248,000	\$418,000	\$0	\$508,000 ^b	\$508,000 ^b	\$0	\$1,077,000
Modifying Criteria								
State Acceptance								
Community Acceptance								

Notes: Fill symbol by quarters from open (poor) to full (excellent).

* Indicates preferred alternative

a The Feasibility Study (FS) for the former Parcel C developed five soil remedy alternatives (S-1 through S-5) and five groundwater remedy alternatives (GW-1 through GW-4). Only relevant remedy components for Parcel UC-2 were evaluated in this ROD. The following remedy alternatives for Parcel UC-2 are equivalent and were combined for evaluation: S-2/3 (S-2 and S-3), S-4/5 (S-4 and S-5), and GW-3/4 (GW-3A, GW-3B, and GW-4).

b The present worth costs for implementing Alternatives GW-2 and GW-3/4 (\$508,000) are equivalent.

Compliance with ARARs. ARARs do not apply to the no-action alternatives for soil, groundwater, and radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures. The remaining soil, groundwater, and radiological alternatives must either comply with ARARs or provide grounds for a waiver. Alternatives S-2/3 and S-4/5 comply with all ARARs. Alternatives GW-2 and GW-3/4 also meet all the ARARs, but with potentially less certainty. Alternative R-2 fulfills all ARARs related to radiologically impacted structures (storm drains and sanitary sewers) or soil associated with these structures.

Primary Balancing Criteria

Criteria Long-Term Effectiveness and Permanence. Alternative S-4/5 is rated highest with respect to long-term effectiveness and permanence because it includes durable covers and ICs. The long-term effectiveness and permanence is lower for Alternative S-2/3, which includes the same ICs but relies on maintained landscaping rather than durable covers. Alternatives S-2/3 and S-4/5 would also provide long-term effectiveness in meeting the RAOs through reliance on continuous enforcement of covenants to restrict use of property to maintain covers and access restrictions. Alternatives S-2/3 and S-4/5 rely on access restrictions for other COCs until ICs are implemented and do not permanently remove any contamination. Since no action will be taken under Alternative S-1, it does not provide a long-term effective or permanent solution to the risks from soil present at the site.

Alternative GW-3/4 provides the highest level of long-term effectiveness and permanence because it includes MNA and ICs. The conditions for natural degradation of COCs will be monitored under MNA. Alternative GW-2 would provide a moderate level of effectiveness and permanence because groundwater plumes would be addressed only through ICs and monitoring to assess the potential migration of contaminants. All alternatives, except for Alternative GW-1, provide an adequate and reliable level of controls.

Alternative R-2 would provide excellent long-term effectiveness and performance for radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures. Alternative R-1 provides very little long-term effectiveness and performance because it includes no action.

Reduction in Toxicity, Mobility, or Volume through Treatment. None of the alternatives proposed for remediating soils at Parcel UC-2 includes treatment as a GRA; therefore, all of the alternatives (S-1, S-2/3, and S-4/5) are rated poor with respect to reducing the mobility, toxicity, or volume through treatment.

None of the alternatives proposed for remediating groundwater at Parcel UC-2 includes treatment as a GRA; therefore, all of the alternatives (GW-1, GW-2, and GW-3/4) are rated poor with respect to reducing the mobility, toxicity, or volume through treatment.

Alternatives R-1 and R-2 are both rated poor because they do not include treatment that would result in the destruction, transformation, or irreversible reduction in radionuclides of concern mobility.

Short-Term Effectiveness. Alternative S-1 has less effect on the community, remedial workers, or the environment because it includes no actions. Alternatives S-2/3 and S-4/5 introduce less risk to these receptors because they do not include excavation, hauling, and disposal of soil that contains contamination; however, Alternative S-4/5 also includes covers, which make it more effective than Alternative S-2/3.

All of the groundwater alternatives scored well in terms of short-term effectiveness according to the criterion. Alternatives GW-2 and GW-3/4 are equivalent for short-term effectiveness. Alternatives GW-2 and GW-3/4 are slightly better than Alternative GW-1 because they impose ICs. Alternatives GW-2 and GW-3/4 pose a very low risk to workers during implementation of the groundwater monitoring program.

Alternative R-1 has the least effect on the community, remedial workers, or the environment because it includes no actions; therefore, it would not disturb the radionuclides of concern. Alternative R-2 includes removing and hauling contaminated soil and building materials from the site. This alternative would pose a potential risk to the community, remedial workers, or the environment, although this risk is considered low and mitigation measures would be implemented.

Implementability. Distinction among the soil alternatives for implementability is minimal. Alternatives S-2/3 and S-4/5 require implementation of long-term ICs; in terms of ICs, Alternative S-2/3 may be more difficult to implement, as long-term ICs and landscaping would be maintained throughout the parcel. Installing covers (Alternative S-4/5) is a standard technology easy to implement. Alternative S-1 does not involve remedial technologies or ICs and requires no implementation.

Distinction among the groundwater alternatives for implementability is minimal. Alternatives GW-2 and GW-3/4 require implementation of long-term ICs. Long-term monitoring (GW-2) and MNA (GW-3/4) are equally easy to implement. Alternative GW-1 does not involve remedial technologies or ICs and requires no implementation.

Alternative R-2 requires use of standard technologies that are easy to implement. Alternative R-1 does not involve remedial technologies and requires no implementation. Therefore, the distinction between these two alternatives regarding implementability is minimal.

Cost. Alternatives S-1 requires no action; therefore, no costs are associated with this alternative. Alternative S-2/3 is less costly (\$248,000) because it includes no active remediation before the property is transferred. The cost of Alternative S-4/5 is moderate (approximately \$418,000).

Alternative GW-1 is rated the highest because no cost is associated because no actions would be taken. The costs of Alternatives GW-2 and GW-3/4 are moderate (approximately \$508,000) because of the long-term groundwater monitoring or MNA.

Alternative R-1 requires no action; therefore, no costs are associated with this alternative. Alternative R-2 is costly (\$1,077,000) but effectively addresses all radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures.

Modifying Criteria

State Acceptance. State involvement has been solicited throughout the CERCLA process. The State of California concurs with the Navy's selected remedial alternatives.

Community Acceptance. Community acceptance is evaluated based on comments received from the public during the public comment period for the proposed plan. The proposed plan was presented to the community and discussed during a public meeting on February 11, 2009. Comments were also gathered during the public comment period from January 29 through February 27, 2009. [Attachment 2](#), the responsiveness summary, of this ROD addresses the public's comments and concerns about the selected remedial alternatives at Parcel UC-2.

2.9 SELECTED REMEDY

2.9.1 Rationale for Selected Remedy

The selected soil remedy for Parcel UC-2 is Alternative S-4/5 (covers and ICs). The selected remedy for groundwater at Parcel UC-2 is Alternative GW-3/4 (MNA and ICs). The selected remedy for radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures at Parcel UC-2 is Alternative R-2 (survey, decontamination, excavation, disposal, and release) for radiologically impacted structures and soil associated with these structures.

The selected remedies provide the best balance of tradeoffs with respect to the nine criteria. The remedy for soil meets the RAOs by covering the entire parcel with covers to cut off potential exposure pathways to arsenic, manganese, and nickel in soils. The remedy for groundwater meets the RAOs by monitoring the natural attenuation of the VOCs for up to 30 years. The remedy for radiologically impacted structures and soil associated with these structures meets the RAOs by excavating and disposing of storm drains and sanitary sewers and impacted soils and disposing of them off site, thereby removing the source of contamination.

ICs, including restrictive covenants regulating restricted land use and restricted and prohibited activities will be implemented to prevent or minimize exposure to areas where potential unacceptable risk is posed by COCs in soil and groundwater. ICs will remain in place as long as contamination remains at the site above levels that allow for unlimited use and unrestricted exposure.

2.9.2 Description of Selected Remedy

Durable covers will be applied as physical barriers for the Parcel UC-2 soil remedy to cut off potential exposure to metals in soil. The RD will include plans for inspection and maintenance to ensure the covers remain intact. Modification of the covers will be governed by the land use control remedial design (LUC RD) report discussed below, and its terms will be enforced by the regulatory agencies. The Navy conducted a site visit on June 30, 2009, to confirm current site conditions and refined the planned cover for Parcel UC-2 as follows:

1. The area southwest of the corner of Robinson Street and Fisher Avenue is a level, paved parking lot. From the parking lot down to Fisher Avenue is a sharp drop varying from 5 to 15 feet, and the slope is vegetated with ice plant and annual grass. The parking lot was identified for a soil cover remedy in the final Parcel C FS; however, based on the current condition, the Navy reclassified the parking lot plus the small amount of property north and west of the lot for pavement cover. The remainder of the area will remain soil cover, as planned.
2. Along the western former Parcel A and Parcel UC-2 boundary, there is a sharp drop of about 15 feet from Parcel A down to Parcel UC-2 that continues along Fisher Avenue to the corner of Robinson Street. This slope is vegetated with ice plant and annual grass and includes a set of concrete stairs leading up to former Parcel A. This area was identified for a pavement cover in the final Parcel C FS, but implementing that remedy on a slope would be difficult. As recommended by the regulatory agencies and others, the Navy reclassified this area for a soil cover remedy.

Details of the design for covers at Parcel UC-2 will be developed in the RD. It is estimated from aerial photographs of Parcel UC-2 that approximately 0.7 acre would be covered with clean, imported soil and maintained landscaping and that 3.2 acres of existing asphalt and concrete surfaces would be used and repaired, as necessary. Because of the steep slope, the type and thickness of the soil cover will be established in the RD.

Under the Parcel UC-2 ROD, MNA will be implemented in and around the VOC plume area in both Parcels UC-2 and C (and also in downgradient locations) for the Parcel UC-2 groundwater remedy. Over the past decade, the level of carbon tetrachloride has decreased by an order of magnitude. The current level of carbon tetrachloride in this area is between 1 and 5 µg/L (as of April 2008), and the Navy expects to meet the remedial goal of 0.5 µg/L within approximately the next 10 to 20 years. Therefore, selecting MNA as a remedy is justified because the remedial goals for groundwater will be achieved in a reasonable amount of time without active treatment. The locations of monitoring points and the monitoring frequency will be specified in the RD. The monitoring plan will be flexible to allow modifications as data are collected.

A soil gas survey may be conducted for the following purposes:

- To evaluate potential vapor intrusion risks,
- To identify COCs for which risk-based numeric action levels for VOCs in soil gas would be established (based on a cumulative risk of 10^{-6}),
- To identify where the initial areas requiring institutional controls (ARIC) for VOCs would be retained and where they would be released, and
- To evaluate the need for additional remedial action to remove ARICs.

The selected remedy for radiologically impacted structures consists of removing and disposing of off site the remaining radiologically impacted storm drains and sanitary sewers and soil associated with these structures while implementing appropriate **dust control measures**⁽³⁹⁾ to meet the objective of unrestricted release throughout Parcel UC-2. Unrestricted release means that a property can be used for any residential or commercial purpose once regulatory requirements have been met. Residential remedial goals will be used for radiologically impacted storm drains, sewer lines, and soil associated with these structures to meet the objective of unrestricted release.

The Navy will address radiologically impacted structures (storm drains and sanitary sewers) and soil associated with these structures at Parcel UC-2 under its ongoing Hunters Point Shipyard radiological removal action program. A removal action completion report will summarize all storm drain and sanitary sewer final status survey reports and survey unit package reports. Unrestricted release is to be granted after concurrence is received on the radiological removal action completion report for Parcel UC-2. If the TCRA does not achieve the remedial goals, work will continue until the remedial goals specified in the ROD are met. Each radiologically impacted structure (storm drains and sanitary sewers) and soil associated with this structure will be investigated through the CERCLA process. The classification of “radiologically impacted” may be removed if the final report of the site investigation is approved by the stakeholders and the site is determined to require no further action.

The survey and removals will occur before any covers are installed as part of Alternative S-4/5. Excavated areas will be surveyed after cleanup is completed to ensure that no residual radioactivity is present at levels above the remediation goals. Excavated soil and drain material from radiologically impacted structures (storm drains and sanitary sewers) will be screened and radioactive sources and contaminated soil will be removed and disposed of at an off-site, low-level radioactive waste facility. Survey and removal of the Parcel UC-2 storm drain and sanitary sewer lines were completed in early October 2009. The draft radiological survey unit report is planned for early spring in 2010.

ICs⁽⁴⁰⁾ will be implemented to prevent or minimize exposure to areas where potential unacceptable risk is posed by COCs in soil and groundwater. ICs are legal and administrative mechanisms used to implement land use restrictions that are used to limit the exposure of future landowners or users of the property to hazardous substances present on the property, and to ensure the integrity of the remedial action. ICs are required on a property where the selected remedial cleanup levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections, and reporting to ensure compliance with land use or activity restrictions.

The Navy has concluded that it will rely on proprietary controls in the form of environmental restrictive covenants as provided in the “Memorandum of Agreement between the United States Department of the Navy and the California Department of Toxic Substances Control” and attached covenant models (the “Navy/DTSC MOA”).

More specifically, land use and activity restrictions will be incorporated into two separate legal instruments as provided in the Navy/DTSC MOA:

1. Restrictive covenants included in one or more Quitclaim Deeds from the Navy to the property recipient.
2. Restrictive covenants included in one or more “Covenant(s) to Restrict Use of Property” entered into by the Navy and DTSC as provided in the Navy/DTSC MOA and consistent with the substantive provisions of *California Code of Regulations* Title 22 § 67391.1.

The “Covenant(s) to Restrict Use of Property” will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC, and EPA, as a third-party beneficiary, against future transferees and users. The Quitclaim Deed(s) will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the Navy against future transferees.

The activity restrictions in the “Covenant(s) to Restrict Use of Property” and Quitclaim Deed(s) shall be addressed in the LUC RD report that would be reviewed and approved by the FFA signatories. The Parcel UC-2 LUC RD shall be referenced in the applicable “Covenant(s) to Restrict Use of Property” and Quitclaim Deed(s). The Parcel UC-2 LUC RD shall specify soil and groundwater management procedures for compliance with the remedy selected in the Parcel UC-2 ROD. The Parcel UC-2 LUC RD shall identify the roles of local, state, and federal government in administering the Parcel UC-2 LUC RD and shall include, but not be limited to, procedures for any necessary inspections, sampling and analysis requirements, worker health and safety requirements, and any necessary site-specific construction or use approvals that may be required. The LUC RD will be submitted in accordance with the FFA schedule.

Land use restrictions will be applied to specified portions of the property and described in findings of suitability to transfer, findings of suitability for early transfer, “Covenant(s) to Restrict Use of Property” between the Navy and DTSC, and any Quitclaim Deed(s) conveying real property containing Parcel UC-2 at HPS.

A Risk Management Plan (RMP) may be prepared by the City and County of San Francisco and approved by the FFA signatories that may set forth certain requirements and protocols for implementing the activity restrictions specified in the ROD.

Access

The Deed and Covenant shall provide that the Navy and FFA signatories and their respective officials, agents, employees, contractors, and subcontractors shall have the right to enter upon HPS Parcel UC-2 for purposes consistent with the Navy IR Program or the FFA.

Implementation

The Navy shall address and describe IC implementation and maintenance actions including periodic inspections and reporting requirements in the preliminary and final LUC RD reports to be developed and submitted to the FFA signatories for review and approval pursuant to the FFA (see “Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions” attached to January 16, 2004, Department of Defense memorandum titled “Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy”). The preliminary and final LUC RD reports are primary documents as provided in Section 7.3 of the FFA.

The Navy is responsible for implementing, maintaining, reporting on, and enforcing land use controls. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity.

Activity Restrictions that Apply throughout Parcel UC-2

The following sections describe the IC objectives to be achieved through activity restrictions throughout Parcel UC-2 to ensure that any necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken.

Restricted Activities

The following restricted activities throughout HPS Parcel UC-2 must be conducted in accordance with the “Covenant(s) to Restrict Use of Property,” Quitclaim Deed(s), the RMP, the LUC RD report, and if required, any other work plan or document approved in accordance with these referenced documents and must be further reviewed and approved by the FFA signatories:

1. “Land disturbing activity,” which includes but is not limited to: (1) excavation of soil, (2) construction of roads, utilities, facilities, structures, and appurtenances of any kind, (3) demolition or removal of “hardscape” (for example, concrete roadways, parking lots, foundations, and sidewalks), (4) any activity that involves movement of soil to the surface from below the surface of the land, and (5) any other activity that causes or facilitates movement of known contaminated groundwater.
2. Alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to pump-and-treat facilities and soil cap/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.
3. Extraction of groundwater and installation of new groundwater wells with the exception of environmental sampling and monitoring requirements described in this ROD.
4. Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

Prohibited Activities

The following activities are prohibited throughout HPS Parcel UC-2:

1. Growing vegetables or fruits in native soil for human consumption
2. Use of groundwater

Proposed Activity Restrictions Relating to VOC Vapors at Specific Locations within Parcel UC-2

Any proposed construction of enclosed structures must be approved in accordance with the “Covenant(s) to Restrict Use of the Property,” Quitclaim Deed(s), LUC RD report, and the RMP with approval of the FFA signatories prior to the conduct of such activity within the ARIC for VOC vapors to ensure that the risks of potential exposures to VOC vapors are reduced to acceptable levels that are adequately protective of human health. The reduction in potential risk can be achieved through engineering controls or other design alternatives that meet the specifications set forth in the ROD, RD reports, LUC RD report, and the RMP. Initially, the ARIC will include Redevelopment Block 10 within Parcel UC-2. The remaining areas of Parcel UC-2 are planned roads, with the exception of a small sliver of Redevelopment Block 17. The ARIC for VOC vapors in Redevelopment Block 10 in Parcel UC-2 may be modified by the FFA signatories as the soil contamination areas and groundwater contaminant plumes that are producing unacceptable vapor inhalation risks are reduced over time or in response to further soil, vapor, and groundwater sampling and analysis for VOCs that establishes that areas now included in the ARIC for VOC vapors do not pose unacceptable potential exposure risk to VOC vapors.

2.9.3 Expected Outcomes of the Selected Remedy

The expected outcome for soil is that risk from the artificial fill would be mitigated through the use of durable covers and access restrictions to restrict exposure. After the remedy has been implemented, the property will be suitable for the uses specified in the redevelopment plan.

The groundwater remedy is expected to achieve remediation goals by MNA. Although attenuation is expected to reduce VOC vapors released from groundwater, ARICs for vapor intrusion may be needed at some locations at Parcel UC-2. Furthermore, the Navy intends to permanently prohibit use of groundwater at Parcel UC-2 through the use of ICs.

The remedy for radiological contamination includes surveys, decontamination, excavation, and off-site disposal. The removal of potential radiologically impacted sanitary and storm sewers and soil associated with these structures is expected to result in a reduction of the potential risks to levels below remediation goals associated with exposure to radionuclides of concern. The storm drains and sanitary sewers are considered “radiologically impacted” in Parcel UC-2; each of the radiologically impacted structures (storm drains and sanitary sewers) will be investigated through the CERCLA process. The classification of “radiologically impacted” may be removed if the final report of the site investigation is approved by the stakeholders and the site is determined to require no further action.

2.9.4 Statutory Determinations

In accordance with the NCP, the selected remedy meets the following statutory determinations.

- **Protection of Human Health and the Environment** – The selected remedy for soil will protect human health and the environment by installing durable covers and implementation of ICs. The selected remedy for groundwater will provide long-term protection by reducing concentrations of VOCs through attenuation. The selected remedy for radiologically impacted structures (storm drains and sanitary sewers) will protect human health by screening excavated soil and drain material from radiologically impacted structures and disposing of radioactive sources and contaminated soil at an off-site, low-level radioactive waste facility.
- **Compliance with ARARs** – CERCLA § 121(d)(1) states that remedial actions on CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. Chemical-specific ARARs are health- or risk-based numerical values or methods that, when applied to site-specific conditions, establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the environment. Location-specific ARARs are restrictions on the concentrations of hazardous substances or on conducting activities solely because they are in specific locations. Specific locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. Action-specific ARARs are technology- or activity-based requirements or limitations for remedial activities. These requirements are triggered by the particular remedial activities conducted at the site. The remedial alternatives selected by the Navy will meet all chemical-, location-, and action-specific ARARs. The ARARs that will be met by the preferred alternatives are summarized in [Attachment 1](#).
- **Cost-Effectiveness** – The selected remedy would provide overall protectiveness proportional to their costs and are therefore considered cost-effective.
- **Utilization of Permanent Solution and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Navy has concluded that a containment remedy represents the maximum extent to which permanent solutions can be used in a cost-effective manner because soil contamination is widely dispersed across the installation. The selected remedy is expected to be permanent and effective in light of the anticipated land use.
- **Preference for Treatment as a Principal Element** – The selected remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because there is no cost-effective means of treating the large quantity of low-level soil contamination and low-level groundwater contamination. The selected remedy for radiologically impacted soil and remediation of radiologically impacted structures and materials does not include treatment as a principal element of the remedy because there is no available technology to reduce the toxicity or volume of radionuclides in contaminated soil or other materials.

- **Five-Year Review Requirements** –The selected remedy will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unrestricted use. As a result, a statutory review will follow the schedule of the on-going site-wide 5-year review after the remedial action is initiated to ensure the remedy is protective of human health and the environment.

2.10 COMMUNITY PARTICIPATION

Community participation at HPS includes a Community Environmental Forum, public meetings, public information repositories, newsletters and fact sheets, public notices, and an IR Program website. The Community Involvement Plan for HPS provides detailed information on community participation for the IR Program and documents interests, issues, and concerns raised by the community about ongoing investigation and cleanup at HPS.

Documents and relevant information relied on in the remedy selection process will be made available for public review in the public information repositories listed below or on the [IR Program website](#)⁽⁴¹⁾.

San Francisco Main Library
100 Larkin Street
Government Information Center, 5th Floor
San Francisco, California 94102
Phone: (415) 557-4500

Anna E. Waden Bayview Library
5075 Third Street
San Francisco, California 94124
Phone: (415) 355-5757

For access to the administrative record or additional information on the IR Program, contact:

Mr. Keith Forman
Hunters Point Shipyard BRAC Environmental Coordinator
Base Realignment and Closure Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310
Phone: (619) 532-0913
e-mail: keith.s.forman@navy.mil

In accordance with CERCLA §§ 113 and 117, the Navy provided a public comment period from January 29, 2009, to February 27, 2009, for the proposed remedial action described in the Proposed Plan for Parcels UC-2 and C. A public meeting to present the Proposed Plan was held at 6:00 to 8:00 p.m. on February 11, 2009. Public notice of the meeting and availability of documents was placed in the *San Francisco Examiner* on January 29, 2009.

3.0 RESPONSIVENESS SUMMARY

The responsiveness summary is the third component of a ROD; its purpose is to summarize information about the views of the public and support agency on both the remedial alternatives and general concerns about the site submitted during the public comment period. It documents in the record how public comments were integrated into the decision-making process. The participants in the public meeting, held on February 11, 2009, included community members, Restoration Advisory Board members, and representatives of the Navy, EPA, DTSC, and the Water Board. Questions and concerns received during the meeting were addressed at the meeting and are documented in the meeting transcript. Responses to comments provided at the meeting and received during the public comment period by the Navy, EPA, DTSC, or the Water Board are included in the responsiveness summary ([Attachment 2](#)). In some cases, the comments made during the meeting did not apply to Parcel UC-2 and only applied to the current Parcel C. Responses to comments pertaining only to Parcel C are not included in this document; these responses are provided in the Parcel C ROD.

ATTACHMENT 2
RESPONSIVENESS SUMMARY

Responsiveness Summary

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Spoken Comment by Michael McGowan received at the public meeting held February 11, 2009		
Comment Number	Comment	Response
1	First, could you please clarify in the document the risk scenarios and the description of residential and industrial and construction worker risk, how that relates to the eventual use of the property, and especially explain if the remedy is going to make all of the area suitable for residential use or are there some areas that won't be suitable for residential use once the remedy is put in place.	The human health risk scenarios and risk to potential residential, industrial, and construction worker receptors are described in the human health risk sections of the Final Parcel C Feasibility Study (SulTech 2008). Each human health risk scenario corresponds to the city's future reuse scenario for the redevelopment block. The applicable remedial goal for an area is based on the future reuse scenario for the redevelopment block. Based on the future reuse, Parcel UC-2 will be remediated to residential cleanup goals.
2	Second, as I understand, Parcel C is going to be an early—transfer parcel. So I'd like the Navy to please explain how the continuity and the consistency in the remediation that's being described here is going to be ensured or carried on once the property is transferred over and some other entity actually does the remedy.	The remedy for Parcel UC-2 will be finalized in the remedial design for Parcel UC-2 after the Parcel UC-2 Record of Decision (ROD) is signed. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process, the transferee will be responsible for carrying out the remedy for Parcel UC-2 under continued regulatory agency oversight.
3	And my last comment is: The radiological work appears to be on its own track, separate from the soil and groundwater remediation. So I would just request that there be a little more discussion of how that's going to be coordinated with the soil and groundwater remediation. Especially if there's an early transfer, does the Navy still maintain responsibility for the radiological work, or will that also be transferred over.	<p>The Navy is continuing to address radiological cleanup under CERCLA. The Navy decided to address radiologically impacted storm drains and sanitary sewers at Parcel UC-2 pursuant to a CERCLA time-critical removal action (TCRA). Although the TCRA may not be completed by the time the ROD is signed, the TCRA is intended to achieve cleanup goals that are identical to the remedial action objectives (RAO) identified in the ROD. In the event that the TCRA does not achieve the cleanup goals, cleanup will continue in accordance with the remedial action selected in the ROD until the RAOs are achieved.</p> <p>The Navy will coordinate the radiological surveys and removals with remediation work for Parcel UC-2 so that the radiological surveys and removals are completed before soil and groundwater remedies are put in place.</p>

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard

(Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)

Spoken Comments by John McCarthy received at the public meeting held February 11, 2009

Comment Number	Comment	Response
1	I would like to know how one acquires the information that Mr. McGowan just cited and -- you know, as a follow-on issue. And also, I am still waiting for the information on early—transfer provisions as they differ from regular transfer process. I've been waiting probably for six months now for that information. I was told several times it would be forwarded by email, and I haven't seen anything yet. I have yet to look up the construction report details per IR-07 and 18 from Parcel B, and I'm looking and waiting for whatever detail may be available for the engineering reports that are supposed to be delivered on prospective construction for -- for example, in Parcel D.	<p>The Final Feasibility Study Report for Parcel C (SulTech 2008) is available for review at the public information repositories. Information on the early transfer process also is available by contacting the U.S. Environmental Protection Agency (EPA) and through the Navy website:</p> <p>http://www.bracpmo.navy.mil/basepage.aspx?baseid=45&state=California&name=hps</p> <p>This ROD is for Parcel UC-2 only. For information on Installation Restoration (IR) sites in other parcels at Hunters Point Shipyard, please visit the public information repositories or contact Mr. Keith Forman, Navy Base Realignment and Closure (BRAC) Environmental Coordinator.</p>

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Spoken Comments by Tom Lanphar, California Department of Toxic Substances Control (DTSC), at the public meeting held February 11, 2009		
Comment Number	Comment	Response
1	Also, I'd like to point out that Parcel C is one of the more complicated and contaminated areas of the base. And the remedy that is proposed includes soil vapor extraction for VOCs [volatile organic compounds]; it includes groundwater treatment through biological or chemical additives; it includes soil removal; and it includes a cover. I'd like to mention that DTSC strongly supports the placement of the cover as part of the soil remedy. I'd also like to thank the Navy for the work and the struggle that we all at the BCT established and came up with this Proposed Plan on Parcel C.	Comment noted.
2	And finally, in the radiological cleanup and the radiological remediation goals, I would like that the ROD is clear that the radiological cleanup goals are based on residential cleanup and that the table that's often in the RODs not include construction worker as remedial action goals. That's not part of our remedial action goals as construction workers. I would like clarity in the ROD.	All radiologically impacted soils will be remediated according to residential remediation goals. The radiological remediation goals for construction workers were deleted from the ROD.

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comments by Tom Lanphar, California DTSC, received February 27, 2009 by email		
Comment Number	Comment	Response
1	<p>Page 16, Soil (Alternative S-5)</p> <p>The Parcel C Proposed Plan preferred alternative for soil proposes leaving in place soil exceeding soil remediation goals for metals, PAHs and PCBs. These contaminants are not associated with the ubiquitous metals associated with fill material quarried from local rock and soil. The proposed plans states:</p> <p>"Elevated levels of metals, PAHs and PCB[s] are located in five areas under portions of buildings 134, 231, 272, 275, and 281. These areas are currently covered by concrete slabs which serve as remedial covers. Demolition of the slabs and excavation into the underlying soil must be approved as provided under the "Restricted Activities" provisions of Insert 1."</p> <p>DTSC disagrees with the Navy's proposal to leave contaminated soil in place under existing covers. The reference in the quoted text to the need for future approvals under the "Restricted Activities" provisions of Insert 1 does not provide any additional requirements or protections than are otherwise required for all of Parcel C. Further, "Restricted Activities" does not require that future land owners excavate and dispose of contaminated soil exceeding remediation goals at these five locations. The proposal to leave this contaminated soil in place reduces long-term effectiveness and is inconsistent with the Navy's remedy as stated in the first section of this Proposed Plan: "Installing soil cover to prevent contact with metals (found throughout the fill material quarried from local rock and soil) in areas that were not excavated." DTSC understands that these buildings are slated for demolition during the redevelopment of Hunters Point. Excavation</p>	<p>This comment applies to Parcel C only and will be addressed in the Parcel C ROD.</p>

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comments by Tom Lanphar, California DTSC, received February 27, 2009 by email		
Comment Number	Comment	Response
1 (Continued)	of this soil after demolition is a practical and protective soil remedial action. In order to obtain DTSC concurrence on the Parcel C Record of Decision (ROD), DTSC requires that the Parcel C ROD include excavation and disposal of soil exceeding remediation goals in these five areas. The excavation and disposal; however, can occur after early transfer of Parcel C and after the buildings are demolished.	
2	<p>Table 7, Preliminary Remediation Goals for Radionuclides</p> <p>In the Parcel C ROD, please do not include Construction Worker remediation goals. Soil must meet residential remediation goals in order for the Navy to obtain "free release" of soil areas. DTSC's understanding is that there is no application of Construction Worker remedial goals in the preferred radiological remedy.</p>	All radiologically impacted soils will be remediated according to residential remediation goals. The radiological remediation goals for construction workers were deleted from the ROD.

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comments by California Department of Public Health (CDPH), received February 27, 2009 by e-mail		
Comment Number	Comment	Response
1	Table 7, Addition of the following footnote "a" to the Soil Resident column in the table: "All radiologically impacted soils in this parcel will be remediated according to Residential Remediation Goals."	A note was added in Table 5, Remediation Goals for Radionuclides, in the ROD to state, "All radiologically impacted soils will be remediated according to residential remediation goals."
2	<p>The California Department of Public Health (CDPH) believes that California Code of Regulations (Cal. Code Regs.) tit. 17 section 30256 meets the criteria for a potential state chemical-specific ARAR and therefore should be included in the list of ARARs for this parcel. The Navy has previously indicated that Cal. Code Regs. tit 17 section 30256 cannot be an ARAR as it is primarily procedural in nature. However, this regulation is also substantive, at least in part. In particular, subdivision (k) does provide a standard for clean up of radioactive material. The text of Cal. Code Regs. tit. 17 30256(k) is as follows: "(k) Specific licenses shall be terminated by written notice to the licensee when the Department determines that: (1) Radioactive material has been properly disposed; (2) Reasonable effort has been made to eliminate residual radioactive contamination, if present; and (3) A radiation survey has been performed which demonstrates that the premises are suitable for release for unrestricted use; or other information submitted by the licensee is sufficient to demonstrate that the premises are suitable for release for unrestricted use." THE REGULATION IS ALSO MORE STRINGENT THAN ANY OTHER RADIOLOGIC-SPECIFIC ARAR.</p> <p>In addition, while the title of the regulation is "Vacating Installations: Records and Notices," the regulation meets the criteria of "relevant and appropriate." The Department is aware that the regulation does not provide a numerical standard, however, a state regulation need not contain a numerical standard in order to be considered an</p>	<p>A state requirement must be more stringent than federal requirements to qualify as a state applicable or relevant and appropriate requirement (ARAR) under CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). See Title 40 Code of Federal Regulations (CFR) Sections 300.400(g)(4) and 300.515(h)(2). It is the responsibility of the state to identify any potential state ARARs that it believes are more stringent than federal ARARs and federal risk-based cleanup levels and to demonstrate why they are more stringent. Neither the Department of Toxic Substances Control (DTSC) nor the California Department of Public Health (CDPH) has prepared and submitted such an analysis and demonstration.</p> <p>Furthermore, the requirements in this regulation appear to be procedural, primarily relating to license termination, rather than substantive requirements. A requirement must be substantive rather than procedural to qualify as an ARAR (see definitions of "applicable" and "relevant and appropriate" in the NCP at Section 300.5.) The ROD was not changed as a result of this comment.</p> <p>The ARARs for Parcel UC-2 were not changed as a result of this comment.</p>

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comments by California Department of Public Health (CDPH), received February 27, 2009 by e-mail		
Comment Number	Comment	Response
2 (Continued)	ARAR. Furthermore, the CDPH has been ordered to use that regulation by a California judge who held that the "the standard in California for decommissioning and termination of licenses for radioactive sites is found in Cal. Code Regs. tit. 17 section 30256 ..." (Committee to Bridge the Gap v. Bonta et. al, Sacramento County Superior Court, Case No 01 CS01445, "Order Requiring Supplemental Return to Amended Peremptory Writ", August 27, 2002.)	<p>A state requirement must be more stringent than federal requirements to qualify as a state ARAR under CERCLA and the NCP. See Title 40 CFR Sections 300.400(g)(4) and 300.515(h)(2). It is the responsibility of the state to identify any potential state ARARs that it believes are more stringent than federal ARARs and federal risk-based cleanup levels and to demonstrate why they are more stringent. Neither DTSC nor CDPH has prepared and submitted such an analysis and demonstration.</p> <p>Furthermore, the requirements in this regulation appear to be procedural, primarily relating to license termination, rather than substantive requirements. A requirement must be substantive rather than procedural to qualify as an ARAR (see definitions of "applicable" and "relevant and appropriate" in the NCP at Section 300.5.) The ROD was not changed as a result of this comment.</p> <p>The ARARs for Parcel UC-2 were not changed as a result of this comment.</p>

Responsiveness Summary (Continued)

<p style="text-align: center;">Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard</p> <p style="text-align: center;">(Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)</p>		
Written Comments by Amy D. Brownell, City and County of San Francisco and Lennar, received February 27, 2009 by email		
Comment Number	Comment	Response
1	We would like to point out for the record, that once the engineering controls and institutional controls are properly installed and maintained the current design of the proposed remedies will cut off pathways for: a) contact with soil contaminants and b) inhalation of indoor VOC vapors and this means that the entire property will be health protective for all types of uses.	The proposed remedial alternatives are specific to the reuse identified for each area. Future residents would be protected in areas currently identified for industrial or recreational reuse only by consistent enforcement of the activity restrictions described by the proposed institutional controls (IC). For example, the area requiring institutional controls (ARIC) for vapor intrusion would need to be maintained in areas currently identified as open space (unless the ARIC could be modified by new data for soil gas). The Navy believes that the proposed remedy would result in an environment that would not pose health risks for future residents. However, future reuse would not necessarily be unrestricted as a result. The following text was included on the second page of the Proposed Plan to note the general protectiveness of the planned revised remedy: <i>"The alternatives described in this Proposed Plan, including operation and maintenance and ICs, will be protective of human health and the environment and will meet the specified cleanup objectives."</i>
2	Soil gas RAOs should be included in the ROD. If the establishment of chemical-specific soil gas remediation goals is delayed until after the ROD, then the cost for this evaluation and regulatory process needs to be added to the ROD.	The Navy has established remediation goals for indoor inhalation of vapors from groundwater. Numeric action levels for volatile organic compounds (VOC) in soil gas will not be established in the ROD, but rather may be set using information used to identify chemicals of concern (COC) from soil gas surveys that may be conducted in the future. The Navy is preparing a draft approach for developing soil gas action levels for vapor intrusion exposure for review by the BRAC Cleanup Team (BCT). The ROD was not changed as a result of this comment.
3	Page 5, Previous Removal Actions and Current Conditions, Paragraph 2, second sentence: Should be referring to SVE at Building 134 not 123, which is on Parcel B.	This comment applies to Parcel C only and will be addressed in the Parcel C ROD.

Responsiveness Summary (Continued)

<p style="text-align: center;">Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard</p> <p style="text-align: center;">(Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)</p>		
Written Comments by Amy D. Brownell, City and County of San Francisco and Lennar, received February 27, 2009 by email		
Comment Number	Comment	Response
4	<p>Page 16, Preferred Alternatives, fourth paragraph: This paragraph discusses elevated levels of metals, PAHs and PCBs under five buildings. The paragraph states “These areas are currently covered by concrete slabs which serve as remedial covers. Demolition of the slabs and excavation into underlying soil must be approved as provided under “Restricted Activities”...” Because these five areas are specifically mentioned in the Proposed Plan, the implication is that these areas are different than the rest of the parcel that also requires approval for any excavation under “Restricted Activities”. The statement leaves it unclear what will be required to obtain approval for excavation under these five buildings.</p> <p>If the intent is these areas will require at least sampling and possibly removal and disposal of contaminated soil, then the ROD should make that clear.</p>	<p>This comment applies to Parcel C only and will be addressed in the Parcel C ROD.</p>
5	<p>Page 18, Groundwater (Alternative GW-3B) – The proposed plan states “Soil gas surveys will be conducted following completion of the groundwater remedies and the data will be used to refine the vapor intrusion risk calculations.” This is a valid statement for areas that contain contaminated groundwater that will undergo groundwater treatment.</p> <p>However, there are other soil gas surveys that will be needed on Parcel C. Since the entire parcel is an ARIC for VOC vapors (as stated on page 23) the only method to remove the restrictions is to either conduct soil gas sampling or get regulatory approval to allow a review of historical information to verify the lack of soil vapor hazards. In addition to your sentence above, please include the following language in the Parcel C ROD that was negotiated for the Parcel B ROD:</p>	<p>The paragraph in question was replaced as follows in Section 2.9.2 Description of Selected Remedy, in the ROD:</p> <p>“A soil gas survey may be conducted for the following purposes:</p> <ul style="list-style-type: none"> • “To evaluate potential vapor intrusion risks, • “To identify COCs for which risk-based numeric action levels for VOCs in soil gas would be established (based on a cumulative risk of 10⁻⁶), • “To identify where the initial areas requiring institutional controls (ARIC) for VOCs would be retained and where they would be released, and • “To evaluate the need for additional remedial action to remove ARICs.”

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comments by Amy D. Brownell, City and County of San Francisco and Lennar, received February 27, 2009 by email		
Comment Number	Comment	Response
5 (Continued)	<p>A soil gas survey may be conducted in the future for the following purposes:</p> <ul style="list-style-type: none"> • To evaluate potential vapor intrusion risks, • To identify COCs for which risk-based numeric action levels for VOCs in soil gas would be established (based on a cumulative risk of 10⁻⁶), • To identify where the initial areas requiring institutional controls (ARIC) for VOCs would be retained and where they would be released, and • To evaluate the need for additional remedial action in order to remove ARICs. 	

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comment from Ronald Young, Young Laboratories, received by mail		
Comment Number	Comment	Response
1	“Why do you not dig canals all thru Parcel C then place bridges and requisite infrastructure so as to make a neighborhood with shops and restaurants much like Vinice [sic], Italy.”	The Navy's Proposed Plan addresses environmental cleanup of existing conditions at Parcels UC-2 and C. Please direct questions or comments about redevelopment of Parcels UC-2 and C to the City and County of San Francisco.

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comment from Juan Monsanto received by mail		
Comment Number	Comment	Response
1	"Good morning. Please change my address to 1814 Castro Street, San Francisco, CA 94131, rather than 1815 Egbert (?). Thanks, Juan."	The change was made to the mailing list.

Responsiveness Summary (Continued)

Proposed Plan for Parcels C and UC-2, Hunters Point Shipyard (Responses are for Parcel UC-2 only. Responses for Parcel C will be provided separately in the Parcel C Record of Decision.)		
Written Comment from Bob Craft Sr., Craft Press, Inc., received by mail		
Comment Number	Comment	Response
1	“Please include me in your bid list for printing this publication, as we have presses that produce these booklets (mail pieces) at a savings to this current booklet of 1-29-09. Thank you.”	The comment does not address the content of the proposed plan. No response is provided.

Reference

SulTech. 2008. “Final Feasibility Study Report for Parcel C, Hunters Point Shipyard, San Francisco, California.” July 31.